

THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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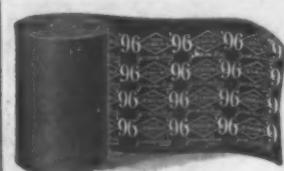
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THE IRON AGE

New York, Thursday, January 19, 1905.

The Hughes Hydraulic Billet Press.

A cheap process for manufacturing steel billets in small quantities was patented in 1901 by William B. Hughes, 210 E. Willow Grove avenue, Philadelphia, Pa. It was particularly intended for plants that are not warranted in maintaining blooming mills and was offered as a means of making them independent and capable of supplying their own steel billets for finished work. A description of the process and the original machine

tensifier showing the shear and billet forming box, the mechanism for releasing the wedge to allow the billet to be ejected, and the mechanism for operating the clamping arm, which holds the ingot while a slice is being sheared off. Fig. 4 is a plan view and shows an electric car upon which the ingot is conveyed to the press and the motor driven rollers on the car which handle the ingot. The same view shows the ram for feeding the

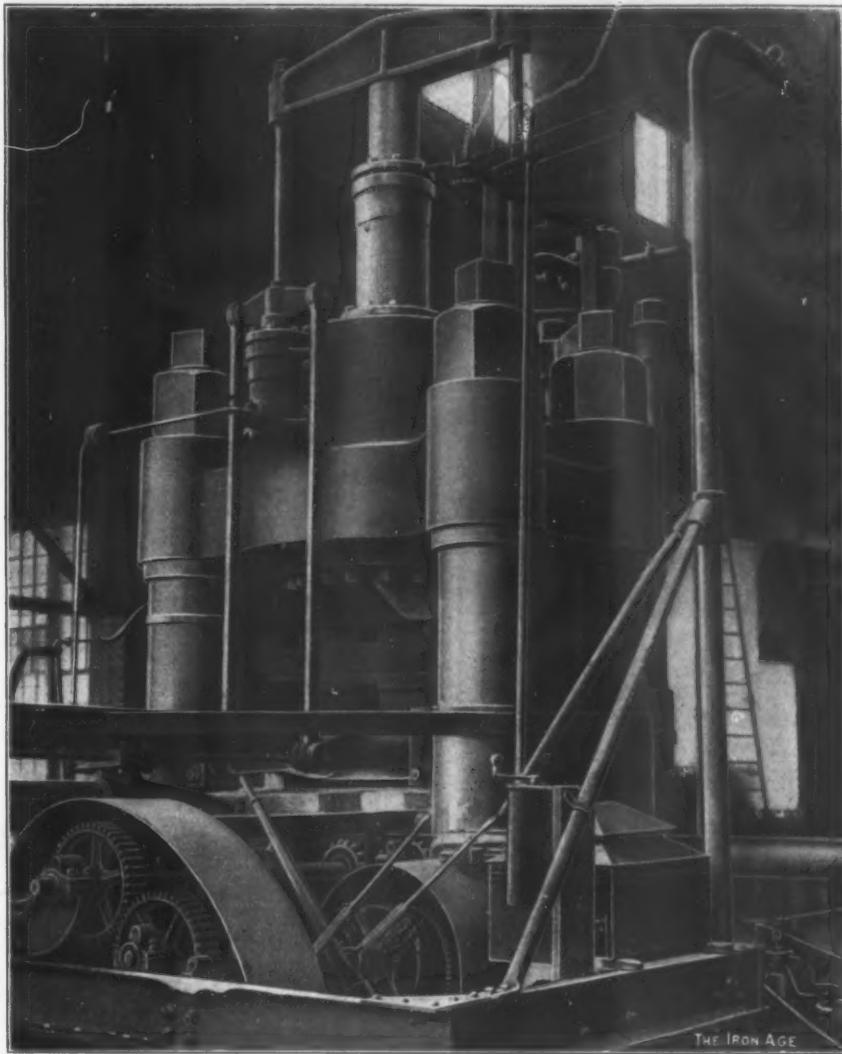


Fig. 1.—The Hughes Hydraulic Billet Press in Operation, Showing the Ingots Being Fed in at the Side.

was printed in *The Iron Age* May 23, 1901. Briefly, the process consists of the casting of a large slab ingot, so that furnaces of good size may be employed, the shearing of the ingot into strips and the simultaneous compressing of the strips into properly shaped billets of homogeneous metal. Since its first appearance the machine has undergone several modifications and patents have been obtained on improved features. In the first machines the ram of the press was horizontal and the ingots were fed in by gravity. In the present form the ram is vertical and the ingots are fed into the press horizontally on roller tables. Two views of the latest form of the press are given in the half-tones, Figs. 1 and 2, and the line drawings, Figs. 3 and 4, show it in plan and section.

Fig. 3 is a vertical section through the press and in-

got into the press and the roller table for conveying the blooms from the press.

The process more in detail is as follows: A top cast ingot with a mean thickness of 8 inches, 40 inches wide and 60 inches high, weighing about 5000 pounds, is given additional heat and conveyed upon the electric car to the press, where the ingot is pushed under the shear block, the pusher following for each successive billet. To the large ram is secured a shear and compressing block, and each stroke of the ram shears and compresses a billet. The compression takes place in a rigidly constructed box. The bloom being compressed to size, the wedge mechanism is released and the bloom is pushed out on the roller table by a hydraulic plunger, shown in Fig. 4, at the opposite end from the roll table. The ingot

is sheared into four blooms, each of which when compressed measures approximately 7 x 10 x 60 inches and weighs about 1250 pounds. When reheated they can be rolled into slabs of 8 inches and under or into 4 x 4 billets, or finished direct into merchant or structural material.

The water pressure used for shearing is 1600 pounds per square inch, and for compressing 5000 pounds per square inch, which is obtained by the intensifier. The compressing stroke is very short and requires but a small amount of water. One stand of 22-inch three-high rolls would be ample for rolling the blooms into billets or slabs for the smaller mills, or this mill might be arranged to roll the billets into finished product. A large range of product can be covered by such a machine, and the

Bolling & Lowe's Trade Review.

The annual trade review issued by Bolling & Lowe, London, England, deals with conditions throughout the world. Omitting the references to Great Britain, the United States, Canada and Mexico, regarding which countries our readers may be assumed to be well posted, the review says:

South Africa.—Progress is slow, but the advent of coolie labor has made a considerable increase in the gold production and also in the employ of surplus white labor. On November 30 there were working 19,316 Chinese, and we anticipate that about 51,000 will be employed by June 30, 1905, while the number of natives also increases. The Transvaal November production was 336,-

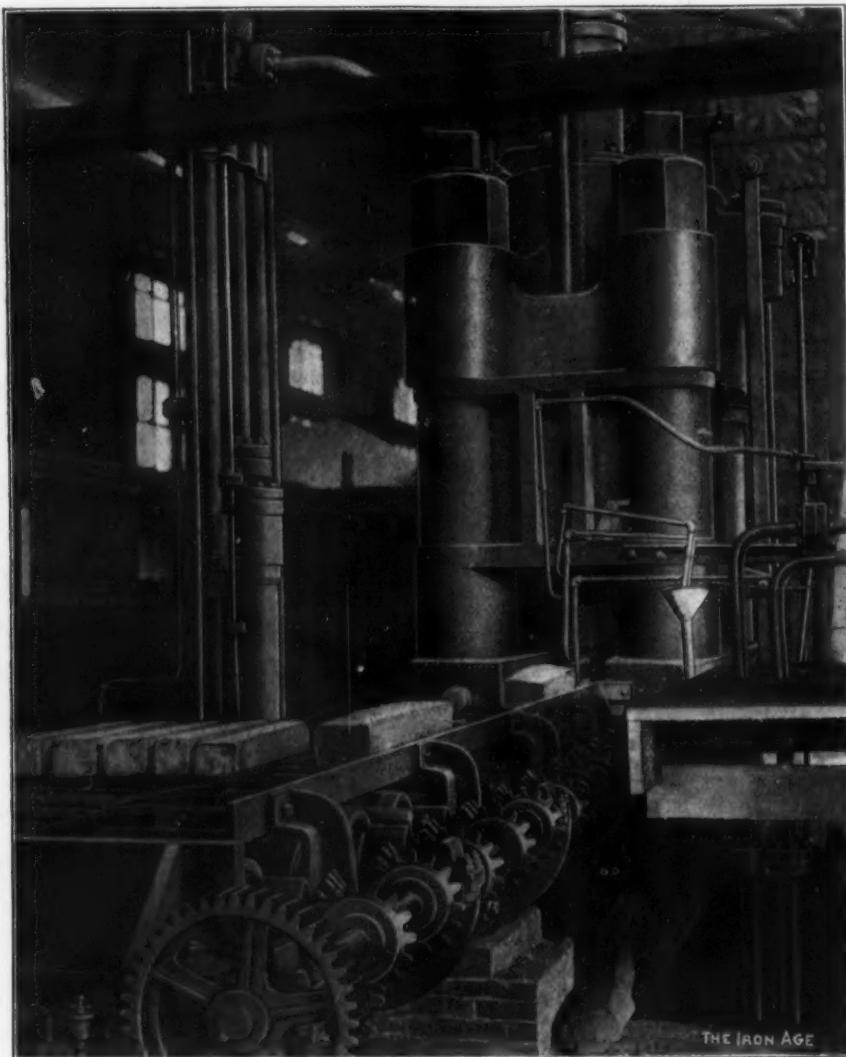


Fig. 2.—Another View of the Press in Operation, Showing the Billets as They Come from the Press.

material should be of a very good grade, particularly the smaller product.

One advantage of this method of billet manufacture has been found to be the small amount of boiler capacity required for running the mill engines and pumps. Outside of the press all of the machinery is of the regulation marketed type, the pumps being the ordinary compound duplex. The inventor states that the press, pumps, valves and accumulator can be installed complete for about \$40,000.

The Western Society of Engineers, Chicago, has elected the following officers for 1905: President, Edward C. Carter; first vice-president, G. A. M. Liljencrantz; second vice-president, Chas. F. Loweth; third vice-president, L. P. Breckenridge; treasurer, Andrews Allen; secretary, J. H. Warder. Trustees: B. E. Grant, T. W. Snow, Geo. M. Wisner. Past presidents in the Board of Direction: W. H. Finley, Ralph Modjeski, H. W. Parkhurst.

167 ounces, the highest since 1899. The future of the country for many years must chiefly depend on an increasing gold output, which means new mining developments and consequent demand for material in this country. The Governments have sanctioned large schemes of railway extension and additions. Contrary to expectation, emigration from here is on a very small scale.

Australia.—Trade is improving, and would improve more rapidly if capital was not alarmed at the progress of the labor party with its socialistic programme. The law forbids the importation of Kanaka labor to develop the tropic and subtropic areas of the continent which cannot profitably be done by white workers, and thus prevents development which would bring greater prosperity there, and an increased demand here to our manufacturers. The evil effects of the drought have passed, and sheep and cattle are rapidly increasing, which greatly enhances the purchasing power of the commonwealth. As in other colonies, the idea of preferential trade with us

has the support of many prominent statesmen. Shipments of wool from Australia and New Zealand from July 1 to October 31 show an increase of 65,000 bales as compared

to be thickly populated, and would then be a market of value for this country.

India has had one of the best years of the last decade. Owing to the enhanced price of cotton the export trade has advanced nearly £6,412,000. Trade returns for the year in all commodities furnish striking evidence of industrial development and prosperity, while the exchange has been favorable.

Egypt.—Taxation is reduced and the national credit rising. Irrigation works to increase the habitable area are urgently required, and so, too, are railroads that will bring the country into closer touch with Europe. The realization of these ideals, and notably of a railroad from Tangier to Cairo, means work for the engineer and employment for the workers in this country, as doubtless a good share of the orders will come here.

Germany, like the rest of Europe, has suffered from trade dullness. The great feature of the year has been-

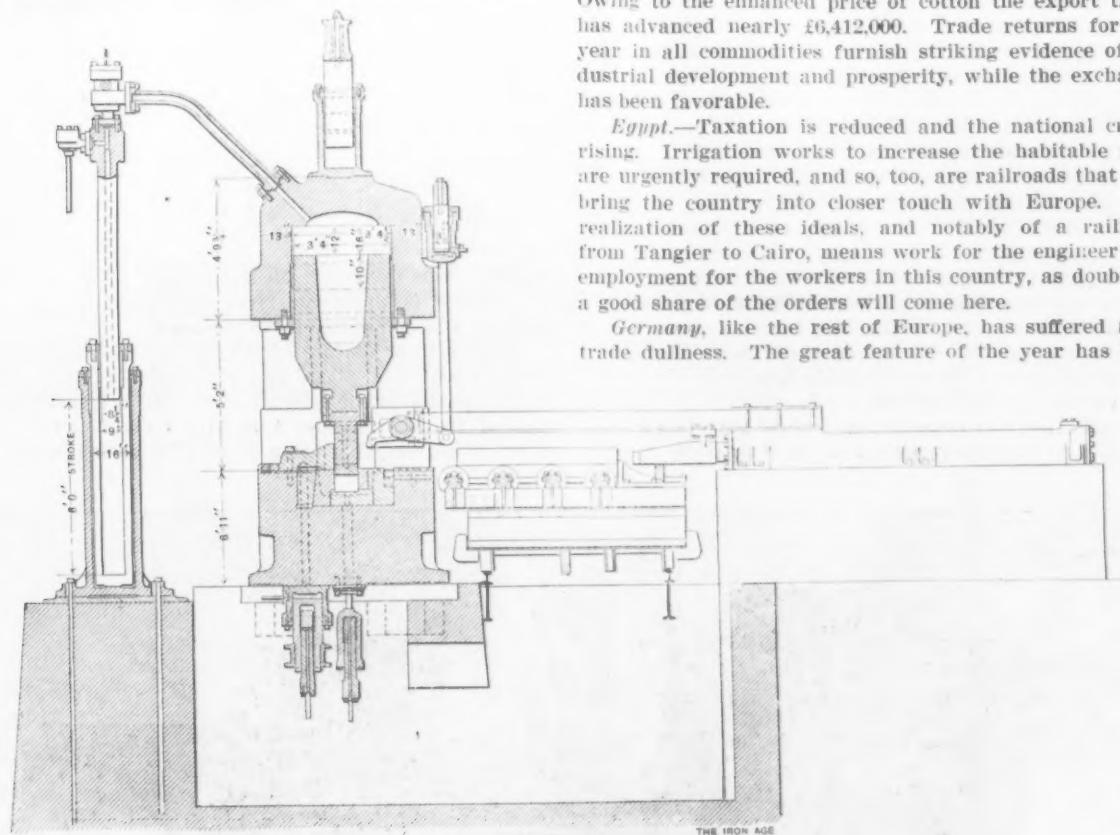


Fig. 3.—Vertical Section through the Hughes Hydraulic Billet Press.

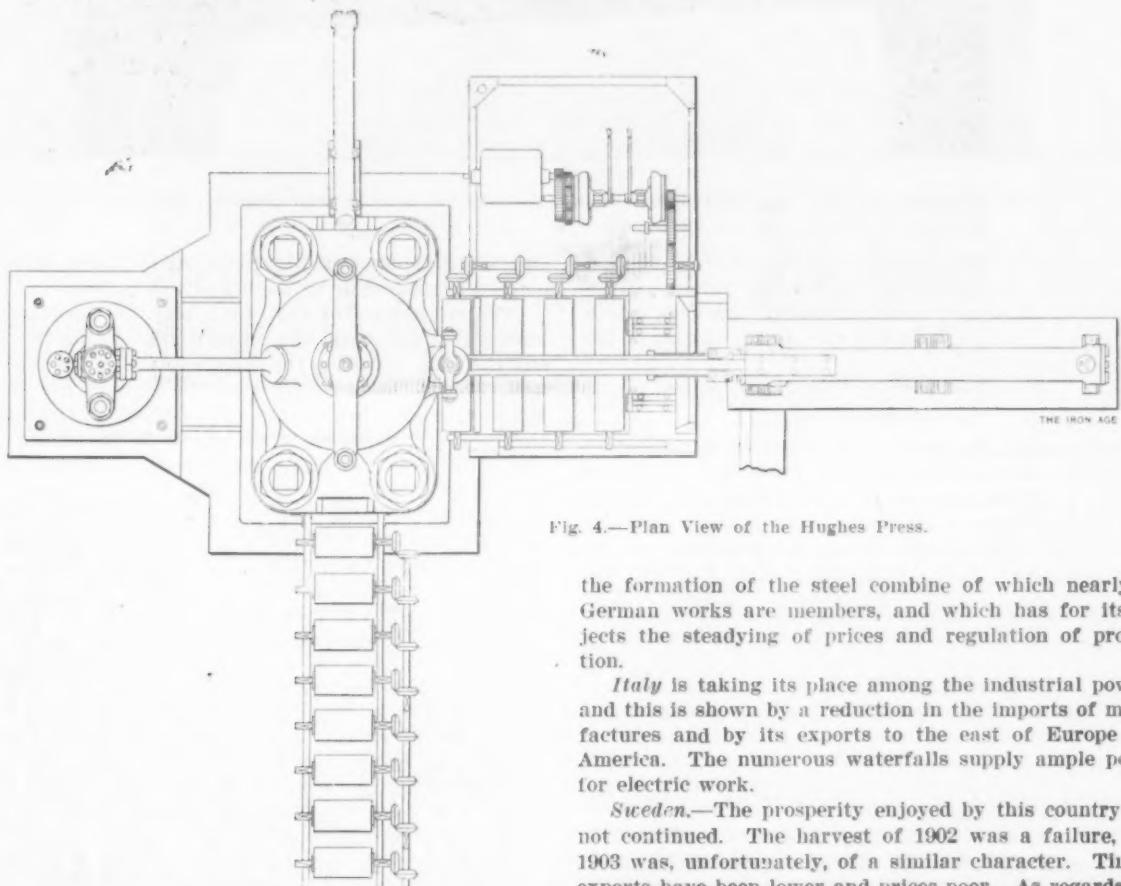


Fig. 4.—Plan View of the Hughes Press.

the formation of the steel combine of which nearly all German works are members, and which has for its objects the steadyng of prices and regulation of production.

Italy is taking its place among the industrial powers, and this is shown by a reduction in the imports of manufactures and by its exports to the east of Europe and America. The numerous waterfalls supply ample power for electric work.

Sweden.—The prosperity enjoyed by this country has not continued. The harvest of 1902 was a failure, and 1903 was, unfortunately, of a similar character. Timber exports have been lower and prices poor. As regards the iron industry, one of the most important export industries, the quantity exported during the first seven months of the year, compared with the corresponding period of 1902, showed an increase of some 2000 metric tons, due to a greater export of pig iron and ingot iron. A decrease

with last year. The Melbourne wool sales have been active, and prices average 5 per cent. higher.

New Zealand continues on the prosperous road, and with a large area suitable for agriculture, ought in time

of 6400 metric tons took place in the export of bar iron. A marked increase is, however, found in the imports of iron and steel goods, more especially in rails and pig iron.

Argentina.—The development of the vast territory governed from Buenos Ayres is a matter of much consequence to Great Britain, which has so large a stake (at least £50,000,000) invested there. It was a source of satisfaction that the threatened war, which would have involved Argentina, Chile, Peru and Brazil, was avoided during President Roca's tenure of office, and that his successor is a man with whom foreign interests will always be carefully considered, and he has been the legal adviser of several of the chief companies operating with "immigrant capital." The imports for the first six months of the year, excluding bullion, show an increased value of \$29,766,654, and the exports \$15,539,456 over the same period in 1903. The United Kingdom has over 35 per cent. of the imports. There are 11,000 miles of railway in working order. Europe depends more and more each year on the republic for wheat.

South American Republics in general have had a prosperous year free from revolution—that bugbear of com-

The Ess Ess Revolving Chuck.

The revolving chuck shown in the accompanying illustrations is designed for use in the manufacture of angular brass work such as steam, water and gas fittings and valves where it is desirable and economical to perform operations on various parts of a single piece of work that are in different planes. For instance, the operations on the two openings of an elbow, the three opening of a Y, or the three openings of a gate or globe valve, including the two seats worked to an angle of, say, 7½ degrees, are all performed without removing the work from the chuck or stopping the lathe. It is known as the Ess Ess revolving chuck and is manufactured by the Scott & Sons Company, Medford, Mass. The novelty of the device is apparent, since the company has been granted a basic patent on the invention.

The peculiar feature of the chuck is its ability to revolve work in a plane at right angles to that of the lathe spindle while the lathe spindle is revolving. A pull of the lever handle A in Figs 1 and 3 revolves the work 45 degrees, that being the regulation index, but this

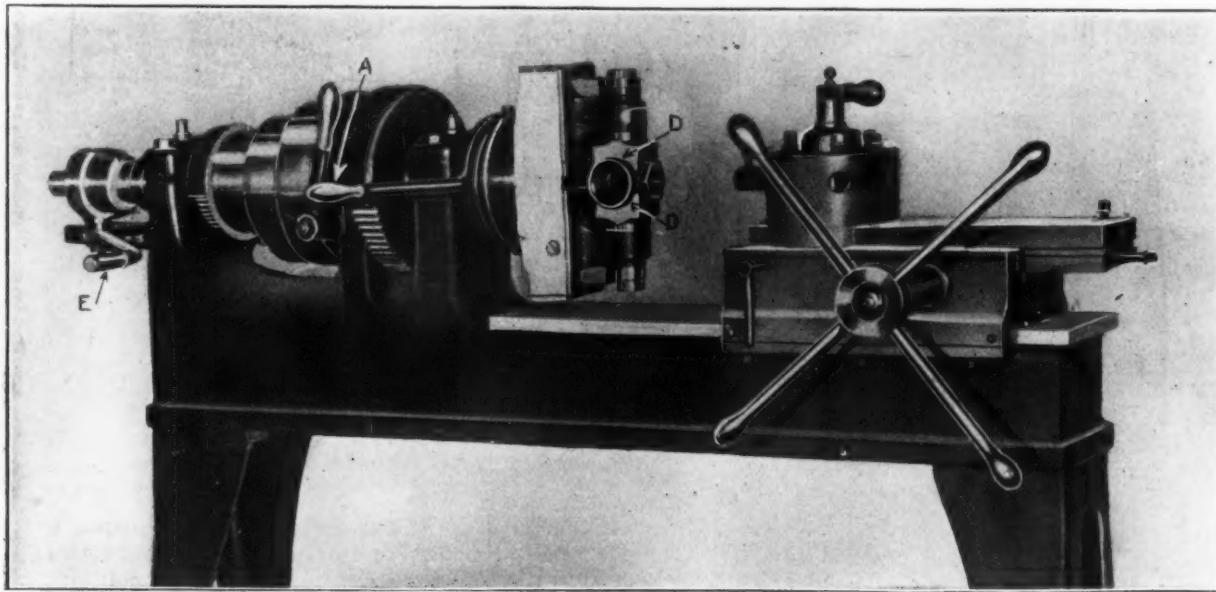


Fig. 1.—A Lathe Equipped with the Ess Ess Revolving Chuck. Made by the Scott & Sons Company, Medford, Mass.

merce—with the exception of Uruguay. The coffee crop of Brazil has been good and secured fair values. Given a period of peace and honest financial measures, South America will, in time, be one of the most profitable of the European markets.

China.—Trade has been fairly well maintained.

Rolling Mill Wages.—The bi-monthly settlement of the bar iron scale, which regulates wages of puddlers and finishers in rolling mills in the Youngstown district, was made in Youngstown, Ohio, on January 12. Wages for January and February will be on a 1.3 cent basis, so that under the terms of the Amalgamated scale puddlers will not receive an advance, while wages of finishers will be advanced about 2 per cent. There will be no increase in wages of puddlers until the card rate for bar iron reaches 1.4 cents. Under this 2 per cent. increase the wages of finishers will be advanced per ton as follows: Heater, 58 to 59 1-10 cents; roller 39 9-10 to 40 7-10 cents; catcher, 21 3-10 to 21 8-10 cents; rougher down, 17 7-10 to 18 cents; rougher up, 14 8-10 to 15 1-10 cents. Pilers on board go from \$1.58 to \$1.62; bushel boy on sand bottom from \$2.05 to \$2.10.

The first move toward the sale of the plant of the Youngstown Bolt Company, at Youngstown, Ohio, to capitalists of that city was made last week when W. C. Carmen was appointed receiver. It is the desire of the stockholders to have the business closed up as soon as possible, and the plant will likely be sold within a short time.

may be made any angle by replacing the index with one notched as desired or by the use of two indexes.

The mechanism of the chuck may be considered as having two functions, one opening and closing the jaws and the other revolving the spindle in which the jaws are held. When the jaws are open the ends of the sleeves B and C, Fig. 2, are in line with the end of the spindle G. In Fig. 2 these parts are shown in the closed position of the jaws. Assuming that a piece of work is in the false jaws D in Fig. 3, the handle E, Figs. 1 and 2, at the head of the lathe is pulled forward—that is, toward the operator—the pull being a quick one, gripping the work practically instantaneously. During this quick pull the mechanical operation is as follows: The handle E moves the sleeve C forward by means of the yoke on the sleeve F. In recesses in the sleeve C are drag springs, by means of which the sleeve B is also carried forward. At this stage of the operation the ends of sleeves B and C are on a line. The sleeve C continues to move forward and the friction balls in screws G ride up the inclines H on the ratchet blocks I, overcoming the resistance of the springs J, and force down the ratchet blocks until their teeth have become engaged with the teeth of the rack K, which is set into and is integral with the spindle. The function of the springs is to lift the ratchet block out of mesh with the rack on the spindle when the pressure of the friction balls is removed, in the reverse operation of the lever, in opening the chuck jaws. The engagement of the ratchet anchors the sleeve B, and as the sleeve acts as the fulcrum of the levers L, it

is easily seen that an opportunity is given for the cone M to force apart the long ends of the levers L, which causes a powerful force to be transmitted to the toggle levers N in Fig. 3 in the chuck body through the medium of the bar O, which leads from the adjusting plug P to the plug Q in the chuck body. The levers L have a ratio of 15 to 1, and this power is further intensified in the toggle levers, which transmit the power direct to the jaws. A reverse motion of the lever opens the chuck jaws.

The adjusting plug P, Fig. 2, is used to increase or decrease the amount of grip on the work. Before adjusting for a given piece of work the chuck is locked upon the work by pulling forward the handle E to its full limit. If more grip is required the handle is pushed back until the locking levers L are in the position shown by the dotted lines in Fig. 2, and the adjusting plug is then turned slightly to the left, or if less grip is desired the plug is turned to the right. In either case one-eighth turn is generally ample to produce the desired result.

idle turns 45 degrees, putting the 45-degree opening of the Y in line with the turret tool. This opening being worked, the lever is pulled three times, each pull accomplishing 45 degrees, until the third opening, in line with the first—that is, 180 degrees from it—is reached. Diversified indexing for special work may be accomplished by using two indexes, one having the regulation 45 degrees, the other special degrees. The special index is placed on top of the other, and a second locking pin is placed over that of the regulation index plate, both pins being operated by the one rocker. In such an instance the locking pin that is first reached by a slot on its index plate is the next to index. The lathe is equipped with the usual turret.

The New Walker Grinder.

Improvements have recently been made on the universal tool grinder made by the Walker Grinder Company, Worcester, Mass. These do not affect the mechani-

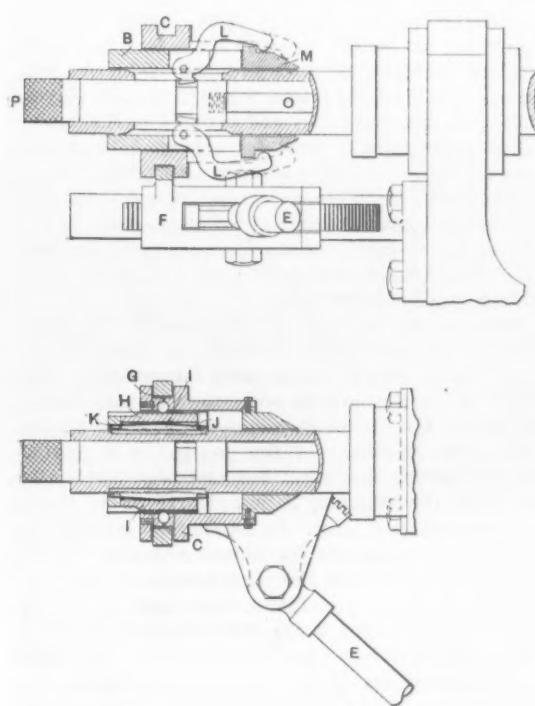


Fig. 2.—Side and Plan Views of the Mechanism at the Head End of the Lathe.

This regulation is required only when a new batch of work is started, and after this the locking device automatically accommodates any variation which may ordinarily occur in castings.

The second operation of the chuck mechanism is the rotating of the chuck jaws. This is accomplished by the handle A in Fig. 3, which carries forward the sleeve R, and this sleeve in turn forces in the plug S. This plug connects with a ratchet band surrounding the rotating spindle T. The pawl in this band acts upon teeth cut into the rotating spindle. Consequently when the plug S is driven in the ratchet pawl rotates the spindle T. The action of plug S also unlocks the rotating spindle. The index, which is integral with this plug, is slotted at any desired angle to take a spring pressed locking pin. Generally it is slotted at each 45 degrees of its circumference. When plug S is driven in it actuates a rocker, which causes the locking pin to withdraw from the index and releases the pin just after the turn of the rotating spindle has begun, leaving it ready to enter the next slot in the index. The ratchet action continues, the spindle rotating, until the locking pin is reached by the next slot. Each forward motion of the handle A causes a rotation of the spindle. For instance, if the three openings of a Y fitting are to be faced and tapped, when the end in line with the lathe spindle has been finished the operator pulls lever A and the rotating spin-

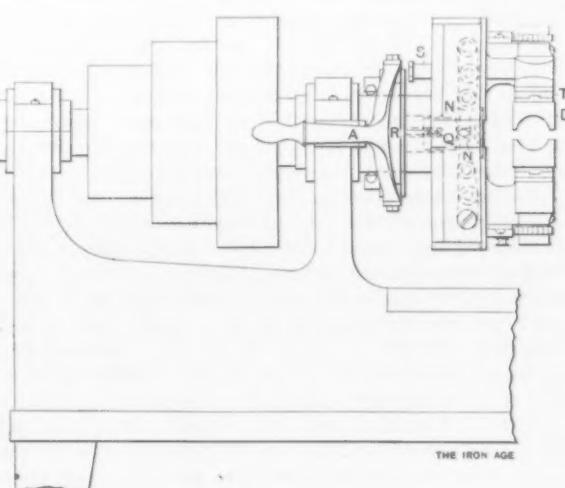


Fig. 3.—Detail of the Ess Ess Chuck Mechanism.

cal operation. As an illustrated detailed description of the grinder was given in *The Iron Age* of July 28, 1904, it was thought necessary to make mention of only such changes as are found in the new grinder. The open column has been replaced by a substantial closed column, and the down leading belt passes inside of the hollow wheel post instead of outside, as in the open column type. The return side of the belt passes through an opening in one side of the housing. This new arrangement permits of a stronger form of post than where the belt is outside the column, because it is hollow and of large diameter. Another change is that the tooth rest holder rests on top of the housing, which brings it always to an exact height. The tooth rest may be bolted to a bracket above the center when it is desired to grind against the cutting edge of the tool, which is often preferred to grinding away from the cutting edge, as it is less liable to draw the temper. In all other respects the new grinder is similar to the one we previously described.

The Oil Well Supply Company, Pittsburgh, reports that its foreign business last year was greatly in excess of that of 1903, particularly to places in the East Indies. During the last three months of 1904 the shipments of iron pipe and supplies to Rangoon and other points in the Far East amounted to more than 2500 tons. The outlook for the present year is said to be very promising. The company also closed extensive contracts during 1904 with concerns in Russia, Roumania, Peru and Mexico. The latter country is now a very promising field, as new oil wells are being dug in the Vera Cruz district. The Mexican Government imposes a protective duty of \$4.68 per barrel on crude oil and \$16.20 on refined, which gives a great impetus to the exploiting of native fields. No refineries have as yet been erected there, but capitalists are now looking into the matter of starting several.

Lake Mining Matters.

Atikokan Range Development.

DULUTH, MINN., January 14, 1905.—Two or three weeks ago this correspondence stated that negotiations between Jas. C. Hunter and associates, owners of a large portion of the Atikokan iron ore range, Ontario, north of the Vermillion region, and Mackenzie & Mann and others were drawing to a close. It is now understood that they have been closed. Mr. Hunter is not in Duluth and no authentic statement can be had, but the deal is supposed to be along the lines that have been known here some time. Through it the Atikokan will be opened for mining; the Canadian Northern road, which is owned by Mackenzie & Mann, will build a short branch thereto; ore docks are to be erected at Port Arthur, on the north shore of Lake Superior, and a furnace industry begun there. Hugh Sutherland, who is associated with Mackenzie & Mann, is largely interested. The town of Port Arthur has offered in return for the furnace, &c., the gift of a large and well situated site on the shore of Thunder Bay, the exemption from taxation of the property of the company for 20 years and to subscribe for \$200,000 of the company's bonds. It is expected, of course, that the erection of a furnace will be a stepping stone to further operations in iron and steel manufacture.

The Atikokan has already been described in *The Iron Age*, especially four years ago, when an option was held by the American Steel & Wire Company on the Hunter-McKellar properties. This option would probably have been closed but for the formation of the United States Steel Corporation and the decision of the latter company not to take up options of that character at once. There is a great exposure of high grade magnetic ore, running some distance and drilled by the American Steel & Wire Company to show a very considerable depth. This ore carries some sulphur, one of the disappointing elements in so much Canadian ore. It was believed by Jos. Sellwood, who carried on the explorations mentioned, that this sulphur was chiefly carried in the walls and diminished to a percentage not too great for successful reduction in the main mass of ore. The phosphorus content of this ore is remarkably low, many assays having been made that show less than 0.01. The ore is very hard and dense, quite dry and rich in iron. It is so located that mining will not be unusually costly.

The Sault Works.

In this connection it is officially reported that the rail mill of the Lake Superior Corporation at the Sault is filled with orders to next October with a tonnage of about 100,000 tons placed by various Canadian lines, chiefly the Government, the Canadian Pacific Railroad, the Grand Trunk and the Canadian Northern. Orders are pending that will maintain the works full into 1906. It is further stated that the Canadian Pacific Railroad has withdrawn from the position that good rails cannot be made in Canada and has placed an order for 25,000 tons of 80-pound rails, with more under contemplation. There is no question that in Western Canada, in points that can be advantageously reached from the Sault or elsewhere on Lake Superior, there will be for many years a large and growing market for rails and other forms of steel. The whole region west from Winnipeg to the Rocky Mountains is now in the condition of the States of Minnesota and the Dakotas in 1880, when the development of wheat growing on a large scale was in its infancy there. There is no industry into which a railroad can build from which the returns will be as quick as one in which wheat is a main crop. A new road, bringing in for its initial freight seed wheat and farming implements with which to turn over the virgin soil, will in 90 days thereafter be carrying away the first crop raised with the aid of those very implements. And the tonnage that comes from a comparatively small area of wheat land is so large and consists of so valuable a freight that the railroad may be earning large profits almost at once.

On the Marquette Range.

Cleveland Cliffs Iron Company shows few changes this new year over a twelvemonth ago, other than the continued development of its Maas mine at Negaunee and developments at Swanzy. At the company's Cliffs shaft,

Ishpeming, there is on surface a large tonnage of uncrushed ores that will be prepared for shipment in due time. A day shift is working in this mine. At its Lake Angeline mine there has been a complete change in surface equipment in the year and a new shaft has been completed and put in operation. It is mining steadily and shows little change either in tonnage or other ways during the past year. The Salisbury is working well and is an important part of the company's properties. Moro is idle. The grade of ore mined there is not in large demand at present, but there are intimations that it may come into the operating list before long. The Negaunee has been under development steadily since the company took possession 15 months ago, and it is being made over in great measure. The past year's production was not so large as might have been the case if this work had not been considered important. At the new Maas the shaft that has been going down for two or three years is now below the 600 level, and at 700 will rest. Ore was cut by diamond drill at that depth, and a level will be driven to reach it. There should be a large and valuable mine if the company is to be rewarded for its costly and persistent efforts to open it. On the Gogebic range the company has been working the Ashland mine for two years, and has already cleaned up enough money from ore produced to pay the \$500,000 bonus required by the Hayes, from whom it bought the lease, and is now "to the good" on the deal. The mine is good for a large tonnage for many years. This company's Mesaba properties are inconsiderable, and are not in operation. Some work has been done the past year on lands at Swanzy, south of the Marquette range, where there are hopes of good ore bodies. One shaft is down and another is to be sunk. Several buildings have been erected.

The Negaunee mines of the Oliver Iron Mining Company are likely soon to be reduced by the practical exhaustion of Queen, which is now being cleaned out. The old Buffalo properties are in somewhat similar condition and cannot long be of importance. Blue is a good mine, and is the mainstay of the group. It is mining well, and the surface equipment has just been materially improved. At the company's new Hartford is being opened a large and good mine. In the Cascade section the company has its steam shovel Moore property, which will be ready for an output the coming season. The use of shovels in that ore was found economical and very suitable last season. This is the only steam shovel mine in the Marquette district. Champion has been idle since it came into possession of the company, and may continue so some time. It has a considerable stock of ore on surface.

The Labor Outlook.

It is estimated that additional men to the number of at least 1800 will be employed in the Crystal Falls section within a short time. These will be distributed at many mines, including Chapin, Aragon, Pewabic, Riverton Group, Nanaimo, Breen, Walpole, Loretto, Antoine, Corrigan Group, Pickands, Mather Group, and others. Indeed the entire Menominee range is looking more active than has been known for years.

The wages paid by the Oliver Iron Mining Company at all its mines, on all lake ranges, have been readjusted to meet present conditions. This readjustment means that they have been advanced to the same level that was in force before the spring of 1904. It is a fact that wages on the iron mining end of the United States Steel Corporation have not been equal to those paid in mills of the concern further east, and it seemed only fair that there should be a change. This has been made without application therefor on the part of the men, and was entirely voluntary. Some of the other mining companies have already advanced similarly, and the rest will be obliged to at once. Men are none too plenty, and the good ones have about all been put at work.

In addition to the contracts for some 20 steel ore ships to be put out at lake shipyards this winter several ships are to be enlarged. Pickands, Mather & Co., who have charge of the Victory and Constitution, steamship and barge, are to have them both lengthened about 75 feet, and their carrying capacity increased about 20 per cent. Other boats of the 4000-ton class will be sim-

ilarly improved if places can be found for them. The Victory and Constitution are both at Duluth, and the work will be done at the head of the lakes. The two ships will be put into dry dock, cut in two, pulled apart, and the additional sections put amidships.

Active Preparations for the Coming Season.

Some little time ago the Oliver Iron Mining Company bought eight 90-ton Bucyrus steam shovels and took an option for six more at the same figure. This option has been closed, and the 14 will be delivered on the Mesaba range in the spring. All are of similar design, 90 tons weight, and with dippers capable of a 5-ton load. Eight will be apportioned to the Hibbing district, where the company has many important mines that are open pit, and the others will be distributed to Mountain Iron and Virginia. In addition to these shovels the company has ordered 100 6-yard standard gauge stripping cars and several locomotives for use in pits. Its intention is to carry on a large amount of stripping development at Mesaba mines without the intervention of contractors, and most of this equipment has been bought with this intention in view. The company has now, with these new shovels, about 60 large machines. This additional order is an indication of what is expected of the Mesaba range for 1905. Railroad managers here have as yet no exact estimates of what is expected of them for the season, but are looking for figures shortly, and are making preparations to receive a vast production with equanimity.

Exact figures of the business of 1904 from the Illinois mine, near Baraboo, have been made out and are 47,735 gross tons. The mine went into the new year with a stock of about 11,000 tons on surface. My estimates of Baraboo shipments for the year had been 50,000 tons.

Interesting announcements of early resumptions at idle mines are coming along as steadily and frequently as depressing reports of closing them were issued a year or so ago. This week it has been stated that Minnesota mine, at Tower, Vermillion range, and Cundy, at Quinnesec, Menominee range, were to start. Both are United States Steel Corporation mines and both are producers of large tonnage for underground properties. Minnesota was closed a year ago, but the pumps remained in operation. It is popularly supposed to be well worked out, but contains several million tons of fair ore yet. It is now a non-Bessemer property and will require about 400 men for full operation. Cundy is capable of a far larger production than it has yet achieved and will employ about 175 men. Old Quinnesec will also be active this year with a fair force of men. Cleveland Lake mine, at Ishpeming, has added a night force of about 200 men. At Iron River, Menominee range, operations are resumed at Riverton, which has been kept unwatered, though idle for some time. Dober mine, of the same group, is to be unwatered and will resume later. Ore hoisting has commenced on the new Youngs mine, adjoining Baltic, Menominee range, and it will be a producer of perhaps 20,000 tons this year. Hiawatha mine, which belongs to the Thomas Furnace Company, operating Minerva furnace, Milwaukee, is to be unwatered and reopened soon and will be a producer of some consequence.

Pickands, Mather & Co. have taken the old Barasa exploration, Negaunee, and will endeavor to develop something of value therein. Exploration is to begin at once and will be pushed rapidly. Barasa has never shown great value, but has not been thoroughly explored by any one.

The International Iron Company, that has been working for the past year on Hunter's Island, just north of the Minnesota boundary, has ceased operations until spring at least. The company has had a drill there since last summer and has cut much jasper and iron formation, as well as some ore, but not enough of the latter to make a mine, or more than to allure the workers on to further expenditure that may later prove what is in that district. The geological surveys have been somewhat favorable to the Hunter's Island region, especially that of Canada, which has compared it to the productive portion of the Vermillion range.

On the other hand, the White Iron Lake Iron Company, which has spent many thousand dollars in drilling on the southerly formation, near Ely, Vermillion range,

has reorganized, secured more money and is to resume operations. It is a case of men without experience and knowledge rushing in where those of the most ample information would fear to tread, but there is always the possibility that the rash experimenter may find what he seeks, even though indications may not point that way.

Explorations are under way on the Deerwood range for the Mahoning Ore & Steel Company, which is the first mining concern that has gone into the region. Work done in that vicinity a year ago by the Oliver Iron Mining Company was on another formation that is said by those who have made the region a study not to correlate with the Deerwood district, to which has been given the somewhat strained name of "Cuygona." The original concern in this district was the Orelands Company and it is at work with others. So that there are now five or six drills in the region, with the probability that the number will be considerably increased with the advent of seasonable weather in the spring.

D. E. W.

Electric Dissipation of Fogs.

The dispelling of fogs by means of electric currents is exciting a good deal of interest among leading physicists of the world. It is possible by the use of electricity to rid the city of London or New York harbor or San Francisco harbor or any other neighborhood of the heaviest fog. The only question is the cost. It may be too great, and this is what a commission is trying to ascertain at the instance of the city of London. The report is looked forward to with much interest. Sir Oliver J. Lodge, one of the foremost of British physicists, is giving this subject profound thought, which is itself proof of the importance of the work and of the probability of the successful solution of the problem. His latest patent, just granted, provides for a comparatively simple electrical apparatus, consisting of "a combination of high potential rectifiers arranged in quadrilateral groups of four, or multiples of four in such a way that, instead of the reverse pulses of the alternating current supply being suppressed or nonexistent as at present, they are redressed to form the positive and negative discharging streams required for deposit purposes." In other words, the alternating current is used, but the pulse is all in one direction.

The property of the electric discharge of causing the coalescent deposit of matters suspended in a gaseous medium has not come into general practical use on account of the difficulties attendant on the use of the statical electrical apparatus, this class of apparatus being too delicate and easily upset for use on an extensive scale, to again quote from Sir Oliver's patent papers. There is nothing new in the knowledge of the general principle involved in all fog dispelling apparatus. The direct current passing through the atmosphere provides, in the form of electrons, the necessary nucleus about which the particles of moisture collect until they constitute drops of rain. To dispel the London fogs, for example, the apparatus would be stationed at different points about the city to project their currents through the atmosphere until the fog has precipitated as rain.

Electrical engineers agree that the cost of such operations would probably be great, measured in equipment and maintenance, as well as in horse-power required. It would mean the establishment of large electric power stations. Possibly such stations might dispose of their power to financial advantage during days when their services are not needed for ridding the city of fog. But the cost of alleviating this moisture and hindrance to business would be considerable, no matter how economically the electric plants might be managed. Yet in considering the cost, it must be with relation to the good accomplished in the health and comfort of the community, as well as to business. A London fog costs a good deal of money. So does a fog in such a harbor as New York. It holds up the routine of business, which is expensive. Thus while it might cost a great deal of money, yet compared with the financial saving by preventing the holding up of business, and with the general public benefit, the expense might be relatively small, as is frequently the case in the matter of large public expenditures.

Rolls for Uneven Angles.—II.

BY WILLIAM HIRST.

Different Forms of Passes.

There are some forms of passes in which the shaping process may be carried on all through the series; there are others in which the section must be formed in the first half of the series and rolled down substantially in the form in which it is ultimately finished. The latter class includes those sections having projections from the main body or from a web, which, if not formed while the metal is hot and the flow comparatively free, are almost certain to be deficient in form and size. These deficiencies are found at the extremities of the section and may be caused by errors in the constructive details of the pass or by disproportionate draft in other parts of the section. As before stated, when the component parts of the section have become well defined and the flow of metal restricted by the interposition of the roll collars, the bar must either be then finished or the section must be of such relative proportions one part to another that the bar may be rolled down to finished size without a further redistribution of the mass. Rails, beams and similar sections are examples of this class, but with angles the forming process may be carried on in a modified degree to the last pass. It is generally advisable, however, to make all radical changes in the first passes while the bar is hot and the mass offers the least resistance. The conditions most conducive to this end are: a position of the pass to obtain the best results from the rolls' action, a billet of suitable size and shape, the outlines of the pass to be such as to aid the transition of the mass under displacement. As a general rule the object in the roughing passes should be to drive the displaced metal toward the largest part or parts of the section. The vertical lines in Figs. 5, 6 and 7, to which is subjoined the outline of the forming collar, indicate the direction in which the collar

the draft should not be too heavy and the pass must be sunk in a groove and well supported by guides, front and back. It may be remarked here that in rolling, as in other methods of forging, the displaced particles actually require time to readjust themselves and that

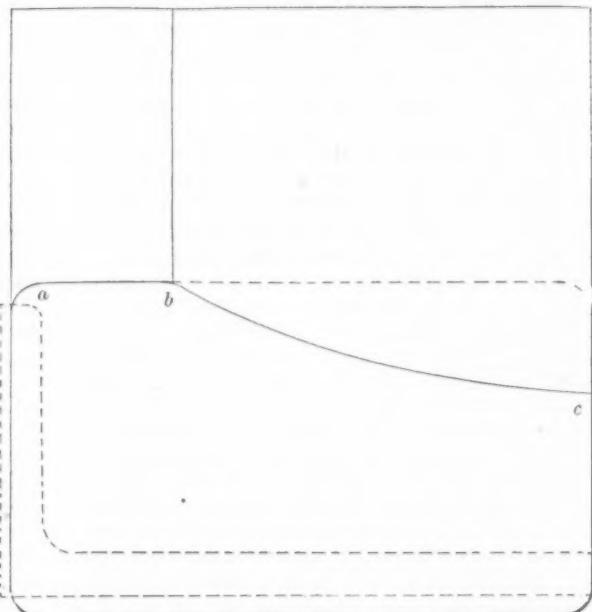
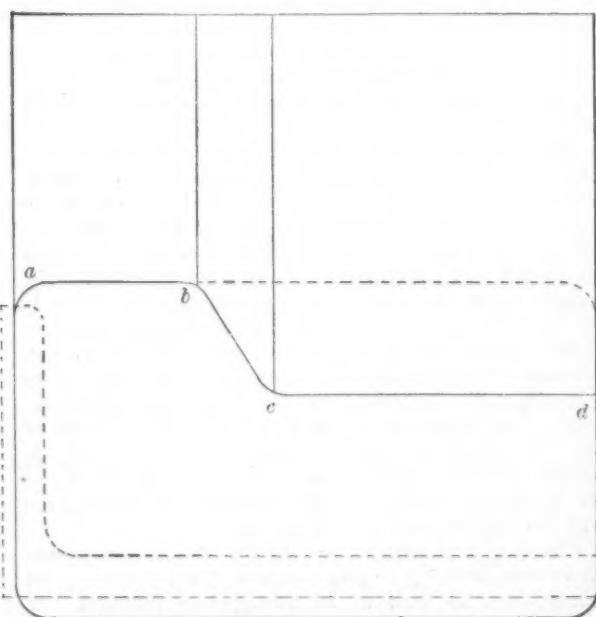


Fig. 6



THE IRON AGE

acts upon the bar. It is seen that by the action of this collar, the face of which is represented by the line *a b c d*, one side of the oblong section of the billet is subjected to considerable reduction and the flow receives no aid from the rolls' action, which is in a line directly across the section. In an operation like this the displaced mass is not forced into other parts of the section, but goes to increase the length of the bar on that side under draft, and if not prevented it would bend sharply away from that edge. When closely held in line by guides and the draft is not too heavy the mass will readjust itself, partly by flowing and partly by drawing out, the portion not being directly reduced. Passes similar to these may sometimes be necessary and can be made to work, but

too much of a change at one operation does not afford this, and should not be done if avoidable. It is the application of the principle underlying this that makes the forging press superior to the hammer—its deliberate action gives time for one particle to impart motion to another, by which they move together and lessen, if not

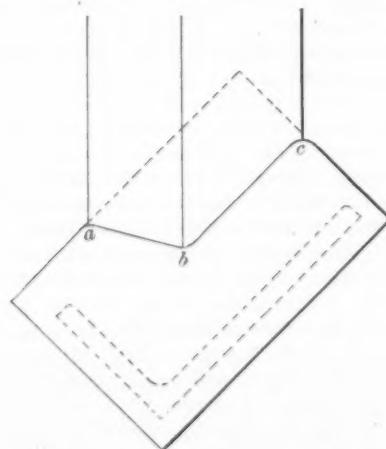


Fig. 7

avoid entirely, all tendency to disintegration. The fact that a number of passes are required to produce a section shows that the operation of reforming the section of the billet cannot be accomplished at one time and that each pass has its limitations in that particular, and a change in section involving great displacement if overdone may result in tearing the structure apart. It is evident, therefore, that it is advisable to carefully consider what form and position of pass are the most efficient and best adapted to promote the most perfect physical structure. It is not mere reduction in sectional area that is in question. When the bar is subjected to a draft proportional to its thickness in all its parts it will stand, and in most cases improve, under any amount to which it may be reasonably subjected, but we may construct passes wherein reduction in sectional area is comparatively slight, yet the change in form may be so radical that the structure may be permanently injured if not torn asunder at once. Steel bears the action of the rolls in a manner greatly superior to iron. The one may stand

a draft that would tear the other apart. Nevertheless, what may prove destructive to one is evidently more or less injurious to the other, notwithstanding its extraordinary cohesiveness under severe trials.

A form of pass as shown in Fig. 6 will work easier than that shown in Fig. 5, for the reason that the general direction of the face of the roll *a b c* is a gradual curve, which would not only be easier in operation but would also help the flow, and would be, therefore, capable of somewhat heavier draft of displacement than that shown in Fig. 5. Fig. 7 is the same form as that shown in Fig. 5, but set in a different position. If we can set the pass in such a position that the faces of one or both rolls may be made to force the displacement into the main body of the section we not only effect reduction, but the readjustment as well. In the position Fig. 7 the vertical lines in which the rolls revolve are also those on which the metal should flow. Comparing Figs. 5 and 6 with Fig. 7 it is readily seen that in the first two both rolls engage the edge of the billet on the right hand and reduce it between two faces which revolve in direct opposition to each other, and it may be readily seen that the flow, which should be to the left, receives little or no assistance from their action. In Fig. 7 the vertical line which is drawn through the pass in the path of the rolls' motion indicates the point where and how the roll engages the bar. It also shows that not only does it assist the flow but that a considerable portion of the displacement, all that to the left of the line mentioned, is driven directly

the pass square with the plane in which the rolls are set, it will be found that one roll is doing more work apparently than the other. It is well known and generally accepted that a roll of comparatively small diameter will reduce a bar with less expenditure of power and less strain on the train as a whole than one of larger diameter. Apparently this is due to the fact that the small roll has less contact with the bar for an impression of equal depth than the larger one, and therefore meets with less resistance. This appears also to be the reason why a smaller roll spreads or increases the width of the bar less than a large one; also that a set of passes working satisfactorily in a train of small diameter sometimes fails to bring the section up to its dimensions, to fill up as it is termed, when turned in rolls of larger pitch. In many instances a roller can alter the normal working of a pass by causing the bar to run closer to one roll or the other, which makes the favored roll cut deeper into the bar. The point in this is that with a flanged or similar section one side may be made to overfill and the opposite to fall short. This may be done unintentionally by a wrong adjustment of the guides, and when the cause and its effects are not understood it furnishes the occasion for the paradoxical statement that a set of passes working well at one time may work badly at another. Given due weight, these instances show that the relation of the diameters of the two roll surfaces forming the pass should be taken into consideration in the design of passes and that by the manner in which the bar is guided into

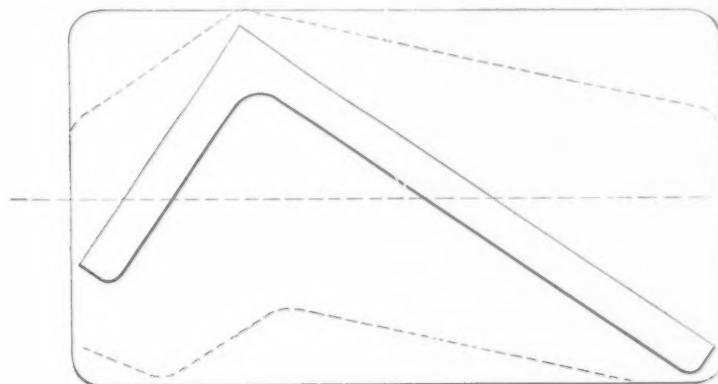


Fig. 8

THE IRON AGE

into the main body of the pass, the part not under reduction. It may be, therefore, inferred that this is the best position for a pass reducing a billet by the method shown in Figs. 5, 6 and 7. Notwithstanding the advantage of its position the preponderance of draft is on the one edge of the billet, and it is not to be expected that the bar would go through the pass without a bending effort, which would have to be met by the guides. It should be noticed also that the long leg will cause considerable side or end thrust, which it would be well to avoid for operative reasons whenever possible. To do away with these objections it will be necessary to design a pass wherein the draft may be equally distributed, and set so that the horizontal projection of both sides of the collars is practically even. In Figs. 5, 6 and 7 the passes are designed to form the angle by making one corner of the billet its root, under which conditions it is impossible to allow an even distribution of draft in the first two or three passes. But if the section is set so that its edges will be formed by the two upper or the two lower corners of the billet it is possible to avoid the defects of the latter forms. In Fig. 8 it will be seen that the draft is distributed all over the section of the billet, and that considered in detail a series of passes laid out on this principle will be found economical in space and to require but moderate depth of grooves.

Effect of Diameter.

In the passage of metal between rolls it is generally taken that each roll presses equally into the bar, practically dividing the work of reduction between them. Investigation, however, shows that this is not always the case, for, unless the diameters of the two opposing faces are approximately the same and the bar enters and leaves

the pass one of the two rolls may be rendered more or less effective than its mate.

The fact is clear that a bar cannot pass between rolls faster than the surface speed of the smallest diameter upon which there is any considerable draft. Taking this in connection with the fact that the small diameter takes an equal if not greater grip on the bar than the larger, and that the largest diameter is directly opposed to the smallest, it shows that the correlation of these surfaces is of considerable importance, and should receive due attention in setting or determining the position of the pass between the rolls, so that the diametric differential, using that term to express the difference which cannot be neutralized within the pass itself, may be as small as possible. In passes where this difference cannot be avoided close guides must be prepared and adjusted so as to counteract its effects. If we pass a bar between a pair of plain rolls whose surfaces are parallel to their axes the speed of these surfaces will be concurrent, and there will be no influence exerted on the bar besides reduction other than to draw it evenly through the rolls. If, however, these surfaces are inclined with reference to the axes of the rolls, as is the case with angles, their diameters are at variance, as is manifested by the action of the bar leaving the rolls. As stated, we find the largest diameter on one roll directly opposed to the smallest on the other, and as the small diameter retards the bar, while the larger tends to accelerate it, that part of the section operated on between them is made to bend away from the largest, and by this action a twisting action is set up. This will be better understood by referring to Fig. 3, in which the lines *r* indicate the relative diameters at the different parts of the pass. In a pass for rolling an angle of equal length of leg these effects are

balanced, as the relation of the two opposing roll surfaces has the same effect on each leg, but in opposite directions; but if one leg is twice as long as the other the pass must take a new position and the balance is destroyed. In Fig. 3 it will be noticed that the diameters

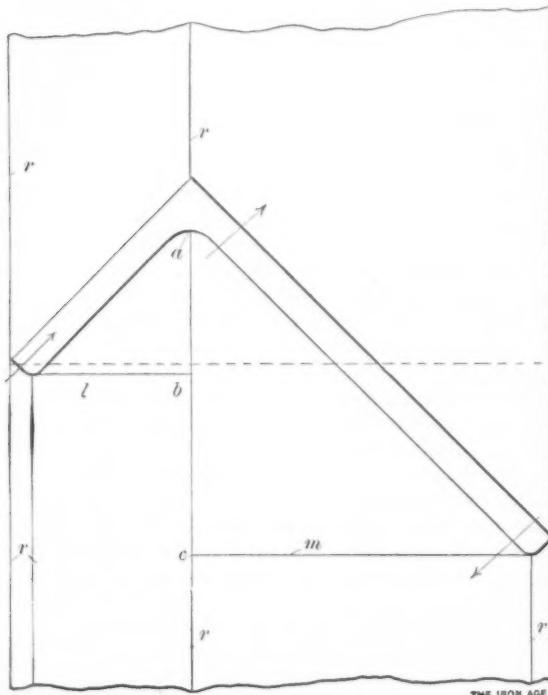


Fig. 3

at the end of the short leg are approximately the same; therefore their speed must be the same; and if this leg were passed through the rolls independent of the other, this end must be drawn through much faster than the other, which will be retarded by the slow surface at the point. It is easy to see that the effect would be to bend the bar edgewise, and at the same time the large diameter at the root would throw the upper edge over and cause a twist. As to the longer leg, while the smallest diameters are the same they are at each end of the leg, but on opposite sides, as are the largest diameters. Taking account of these effects on the bar as a whole, as indicated by the arrows, we see the reason why a pass set in this position tends to turn the bar over. The twisting effect of this pass can be materially lessened by setting it near enough to the upper roll to make the diameters at the end of each leg the same—that is to say, the radius r on the upper left shall be the same as r on the lower right. This, however, greatly increases the already too great difference at the root of the section. In such extreme cases the slip of the roll at the point inside the section is of such moment as to rapidly wear it away, not only abrading the surface, but causing the bar to have a rough, streaked appearance as though the metal had been rubbed off. When passes are set as in Fig. 3 it is essentially necessary for the successful working of such to have closely fitted double guides to keep the bar straight, and in the finishing pass this end is further aided by making the draft light. It is true that when the pass is set nearer in this case, the upper roll, this twisting motion may be lessened, but when rolling bars where the inequality in the length of leg is comparatively small it may be entirely overcome by distributing the draft in such a manner as to favor the short leg. In extreme cases, as illustrated, it is impossible to wholly counteract the diametric differential in the pass itself in the manner just described; therefore either guides must be given the additional function of straightening the bar or the axis of the section relative to the rolls must be changed, as shown in Fig. 4. When rolls are set up tight and firm in their housing there can be no change in their position except that due to the spring of the rolls themselves and their means of adjustment, but in the operation of the form of pass just described there is a considerable end thrust, and as the rolls work themselves

loose an endwise movement of the rolls begins, which if not taken up will wear away one side of the grooves and their entering collars. By drawing the line $a\ c$ in this figure (3) perpendicular from the highest point of the collar on the lower roll and the horizontally projected lines $l\ m$ from the lowest points of the pass to the perpendicular we have in the difference $b\ c$ between the length of the two projections $a\ b$ and $a\ c$ the relative value and the cause of the end thrust. In Fig. 4 the projections of the two sides of the pass are equal, and as far as the position of the pass is concerned this is avoided. Moreover, in this position it will be seen that there is the least possible difference in the diameters, and not only this, but the diameters at both sides of the pass are equal, which most certainly causes this pass, or one for any analogous section, to work easier and therefore more satisfactorily. The position shown in Fig. 3 is necessary when different thicknesses of section are to be made in the same pass, and if the pass is set in the position shown in Fig. 4, so as to make the diameters at the ends of the legs nearer alike, some provision must be made in the arrangement of the collars whereby the rolls may be adjusted endwise to offset the difference in the angles

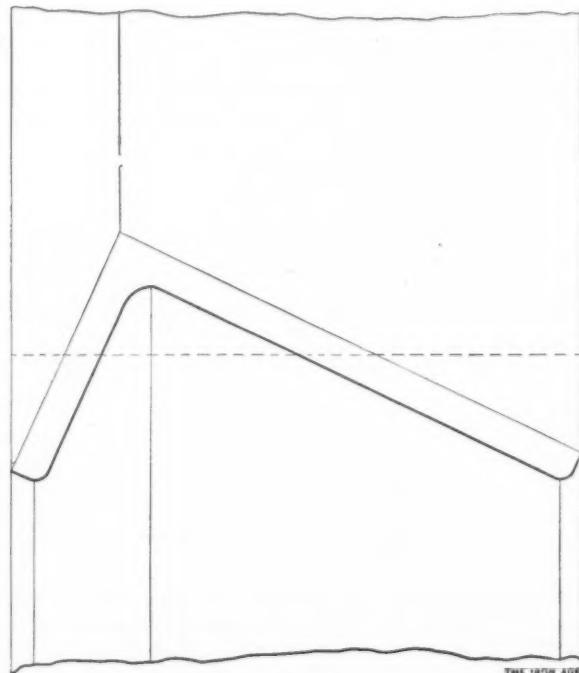


Fig. 4

of the two legs in their relation to the axes of the rolls. It is apparent that if the rolls containing this form of pass (Fig. 4) were merely separated—that is, moved further apart—the long leg would increase in thickness more than the short one. This makes a special arrangement of the taper on the side of the collars essential to permit the endwise movement necessary to equalize the thickness of the legs, an arrangement which will be referred to more particularly hereafter.

Difference in Sections.

Uneven angles from a roll turner's viewpoint are divided into separate classes, as each one may, and as a rule does, present features that require a distinct mode of treatment. While all are generic of the common angle, each presents some characteristic peculiar to itself. Fig. 9 is uniform in thickness but of unusual inequality in length of flange. Fig. 10 is approximately equal in length of leg but of unequal thickness. The Z-bar, or double angle, Fig. 11, is unequal as to the number of its members. Figs. 12 and 13 are not only unequal in length but also in thickness and irregular in form. There are of course numerous modifications of these forms, but all have points in common while considering the best and most efficient means to produce them. With sections of equal thickness the draft should be practically so all over it. On sections of unequal thickness the draft should be nearly if not exactly proportional, a requirement which

is not always easy to obtain, which will be shown hereafter. In sections having minor angles, projections, depressions or fillets on their surfaces, while the draft should favor these it should not alter their relative positions; the correlation of each point or divergence, projection or depression must be maintained throughout the series of passes. Other than that which relates to its

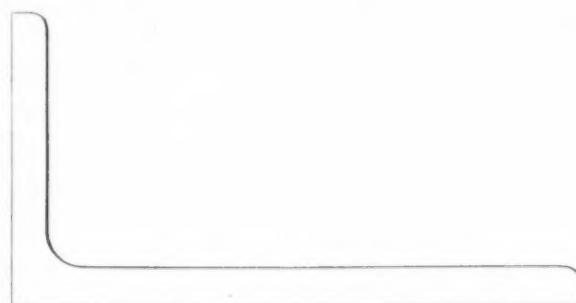


Fig. 9

position in the rolls as compared with others Fig. 9 presents no special problem in the design of the passes to produce it. Fig. 10, as has been stated, requires a preponderance of draft on the thick part of the section, and passes should be designed and set in the rolls with this end in view. Fig. 11, like Fig. 9, presents no special details for consideration; its form determines its position, and it is only necessary to lay out the passes so as to

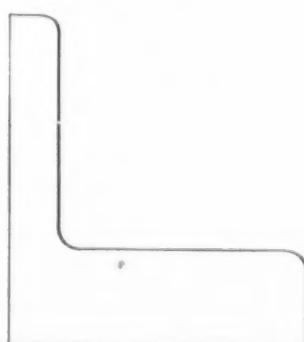


Fig. 10

transform the billet into the section required. Figs. 12 and 13, as sections, are irregular and uneven in all respects and have peculiarities in detail which require modifications in the design of the whole series of passes.

Before commencing the design of a series the general characteristics of the train upon which the bar is to be rolled, the number and available length of the separate sets of rolls, the facilities for the manipulation of the bar and whatever special features there may be available should be taken into consideration, so that due advantage may

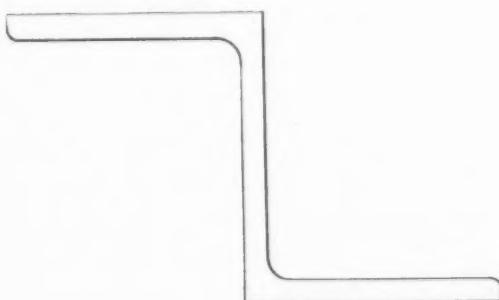


Fig. 11

be taken of their usefulness. Rolls of relatively large pitch are most advantageous; the draft in the first passes may be made as heavy as desired, so far as the strength of the rolls need be considered. Rolls of large size will also more readily seize the billet and draw it in. This point in itself is important when the highest efficiency of the rolls is to be attained. With a train having a suffi-

cient number of sets of rolls the various passes may be so distributed that a number of bars may be under way at one time, as is the practice in trains designed for great capacity. If, however, the quantity required is small the passes may be designed with the idea of grouping them in a limited number of sets of rolls for economy in weight and time required for turning them. In a set of passes for rolling an ordinary angle the main effort is to roll out the trough formed between the sides, it being assumed that as the exterior surfaces approximate the shape of the billet they are a minor consideration. This easy assumption sometimes leads designers when working up a new section to overlook or not sufficiently ap-

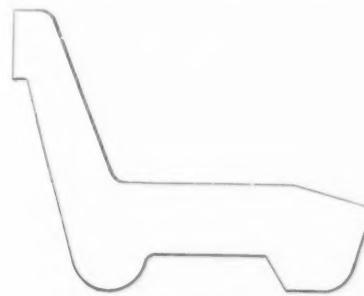


Fig. 12

preciate the important principle that the effort or pressure of one roll must be met and balanced by its opposite.

If one side of the bar is formed by a closed groove, with more or less tapering sides, it will be found that that roll offers more resistance because of the relatively large surface in contact with the bar. As remarked in the first part of this article, if a bar is passed between two plain rolls equal in size each roll will make an equal depression in the bar, but, as just stated, if one side of the bar is in a closed groove the conditions become different, and instead of reduction being effected on that side the tendency is to force the bar against the opposite roll. Whatever reduction is effected on the outside of the bar goes to shorten the length of the legs. The inside of the bar must come alternately in the groove, and that this tendency may be less effective the shape of the passes

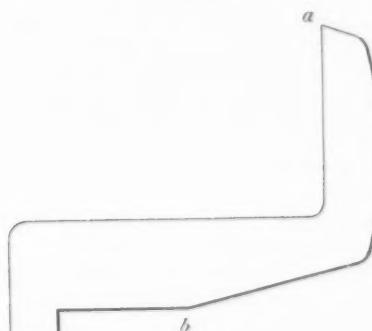


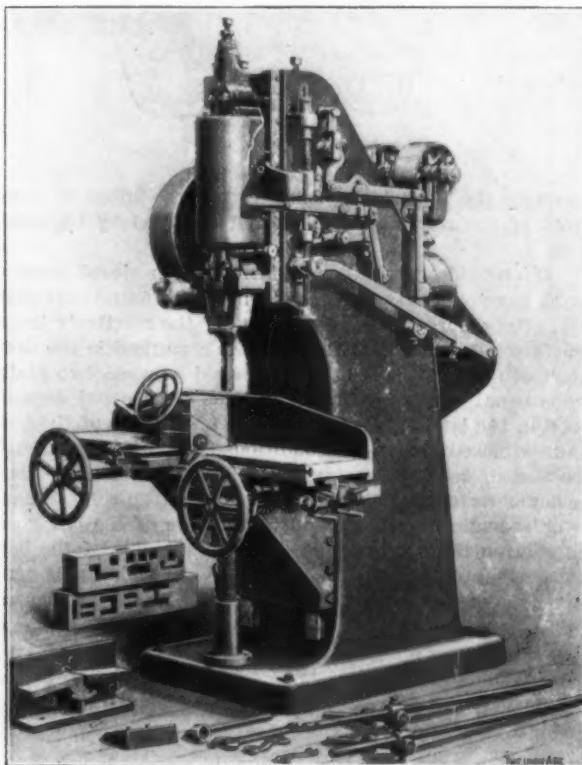
Fig. 13

should be so arranged that the point of the collar forming the inside of the bar will engage first by making it a more acute angle than the one preceding, that the object of the rolling in the trough may be advanced as much as possible. These passes, as compared with their alternates, will be found somewhat less efficient in this particular. If it were possible to produce a section without reduction on the outside of the bar the size of the billet would need be no more than the size of the finished section, but in ordinary practice, for a section having even legs the billet must be from 10 to 20 per cent. larger, depending on the excellence of the design. This applies more to the straight sided passes than the curved, and to passes whose sides have the same taper as referred to the axes of the rolls. If, however, we turn the position of the pass so that the line of one leg comes nearer the axis of the roll, as in Fig. 4, the other will lose more, and therefore due allowance must be made. Failure to do this sometimes accounts for otherwise un-

accountable shortages. There are designers who are so well acquainted with this principle that they can and do take advantage of the tapering sides of the grooved roll to hold the bar, merely riding it through, allowing the collar on the opposing roll to do the work laid out for it to do, without any reduction in the groove at all.

The Defiance Mortising Machine.

A machine specially designed for railway car and ship builders and manufacturers of wagons and agricultural implements and containing many improvements has recently been brought out by the Defiance Machine Works, Defiance, Ohio. The accompanying illustrations show the machine, which is known as the No. 1 automatic vertical hollow chisel mortising machine. The working feature is a hollow square chisel within which an auger revolves, the whole being attached to a vertical moving ram, which is fed down to the work, a single movement producing a



The Defiance Hollow Chisel Mortising Machine.

clean square mortise of the exact size of the tool used. Mortises of various lengths and widths can be cut by moving the table horizontally to the right or left or front or back while using a single auger and chisel. With the machine are furnished augers and chisels for $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$ and 1 inch square mortises. A desirable feature is that all of the working parts are outside of the frame in plain view and easy of access. A system of stops and gauges on the table is provided for assistance in laying off the work.

The frame is a single casting with cored center and broad base. Its strength is sufficient to withstand the heaviest class of mortising safely and without vibration. The ram has a quick return movement, and is balanced in any position without weights or springs. It is gibbed to the frame in planed ways, and is reciprocated vertically by a heavy worm gear and a screw which runs in oil and is driven by a double friction clutch. The ram has a stroke up to 10 inches, its position being controlled by a hand lever, by moving which it may be instantly started or stopped or reversed at any point. The depth of the mortise can be changed while the machine is in motion by means of a screw adjustment. There are four rates of feed on the ram, so that mortises as large as 2 inches square may be cut in either hard or soft wood at a single stroke. The auger spindle runs in self lubricated bearings. The upper end rotates against an ad-

justable bronze screw, which takes the end thrust and is also self lubricated. Pulleys for driving the auger spindle are arranged to automatically maintain a uniform belt tension.

A compound table is gibbed to the front of the machine and is supported on a heavy steel screw after the manner of a table on a milling machine. It is raised and lowered by a convenient hand wheel. To facilitate the duplication of mortises the table is provided with stops having micrometer adjustment. These may be lifted out of action and the table may be moved in either a longitudinal or lateral direction to its original position without affecting any of the adjustments. For angle mortising a chuck is furnished with a graduated setting arrangement for a range of 20 degrees. Gauges are also supplied for gauging from the end of the work or from the mortise. An adjustable clamp for holding the work is fitted to the table, which will accommodate stock 12 x 15 inches square, and the machine will cut mortises in any position in a piece of timber of this size or of any size under. The machine occupies a floor space of 48 x 70 inches and requires 2 horse-power for its drive.

Recent Customs Decisions.

The Board of United States General Appraisers on January 14 overruled a protest by C. B. Rouss and the Estate of C. B. Rouss against the classification of small metal ash receivers as manufactures of metal at 45 per cent. The importers claimed that they were dutiable at 35 per cent. as toys. A similar claim by the same importer as to small metal savings banks was also overruled on the same day.

That the presence of a customs officer is not necessary at the opening of every package of an importation in order to establish a claim for shortage or nonimportation was the dictum handed down on January 14 by the board in sustaining a protest by Saenz & Co., New York. The importation consisted of hides and as entered the invoice called for 175. When the packages were opened at the warehouse of the importers it was found that there were only 78 hides actually contained in them, and the importers put in a claim for the nonimportation of the balance. The decision says: "The law requires that an examination of one package only out of every ten is sufficient. The other nine packages are generally delivered to the merchant without examination, unless fraud or other imposition is suspected by the collector. It would be entirely impracticable for the local appraiser at a large port like that of New York to send examiners to the stores of merchants to supervise the opening of packages not examined. Moreover, the merchant has no reason to suspect that any of the goods mentioned on his invoices are missing until the packages are actually opened and the fact of shortage thus disclosed."

Chicago Traffic Bodies Meet.—A joint meeting of the traffic committees of the Board of Trade, the Illinois Manufacturers' Association and the Chicago Shippers' Association was held in Chicago on January 12 to discuss the proposed national legislation for the regulation of railroad rates. It was hoped that the three bodies might arrive at some concerted plan of action, but it developed in the meeting that the Chicago Shippers' Association was more friendly to the railroads than the two other associations and that while the Illinois Manufacturers' Association was urging the passage of the Quarles-Cooper Bill, the Board of Trade was particularly interested in securing such legislation as would restore to Chicago some of its lost prestige as a grain receiving center, while the Chicago Shippers' Association took the stand that the shippers and the railroads could get together and themselves agree upon methods of regulating rates that would be mutually satisfactory.

The Homes & Blanchard Company, builder of heavy mill machinery and doing business for about 50 years at Boston, Mass., has made an assignment to Edward M. Moor and Nathan H. Rogers; liabilities, about \$20,000, and assets estimated at \$10,000.

A New Design for a Hand Traveling Shop Crane

BY H. G. TYRRELL, CINCINNATI.

The accompanying illustration shows a new form of shop crane, designed by the author. The principle feature of the design is that it gives the greatest possible amount of lift, or clearance beneath the crane bridge, and at the same time allows space for knee braces in the building frame. In the case of steel frame buildings with traveling cranes of the usual type a large amount of vertical space is lost by keeping the crane low enough to clear the side knee braces; or if such clearance is not provided the stiffness of the building frame is sacrificed, either by omitting the knee braces or by making them so small that they are almost useless. In this new design ample room is left for deep knee braces, and at the same time the crane bridge is placed close up under the roof trusses.

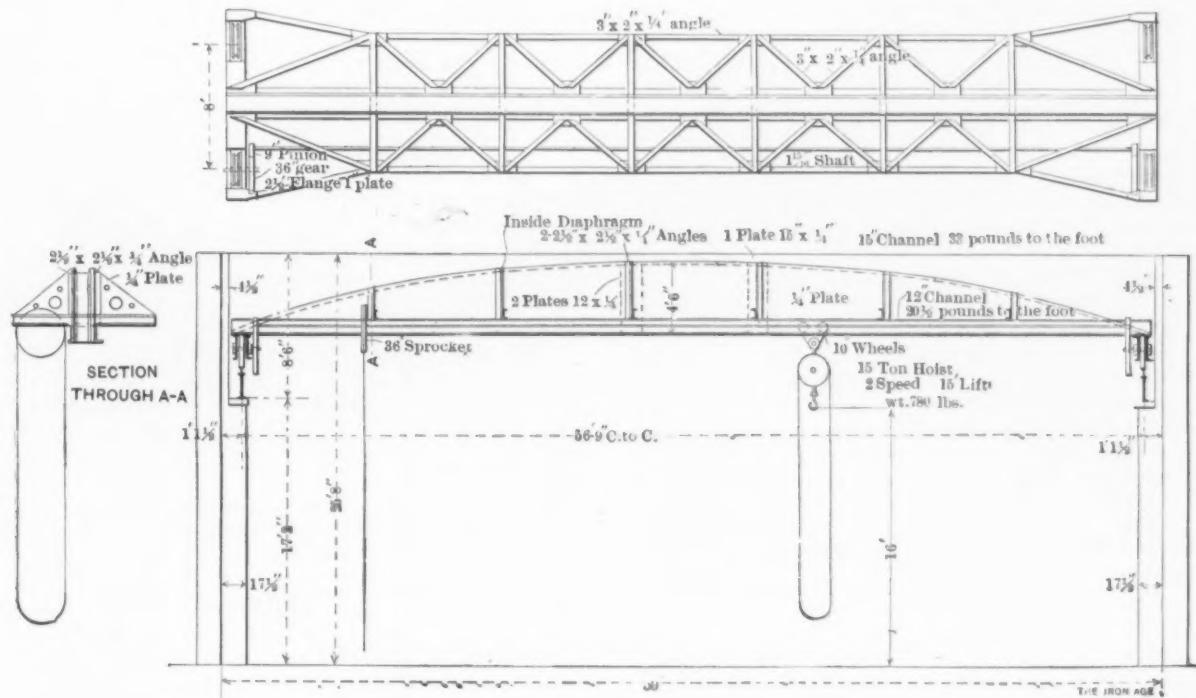
Another important feature of the design is the side or lateral bracing. It is of the utmost importance that an effective shop crane should travel truly parallel with the building. Where insufficient bracing is provided the frame is liable to get out of square and one end travel in advance of the other. To prevent any such tendency this

at the lower side and united by a pin on which the hoist block is sustained. The trolley runs in the outer faces of the channels, which form the lower chord of the crane girder. The hoist block is forged from the best refined iron and is amply strong to carry its maximum load. It swivels on hardened steel balls turning between disks.

The material of the bridge and other riveted parts of the work is medium open hearth or Bessemer steel, with an ultimate capacity of from 50,000 to 60,000 pounds per square inch in tension. The maximum fiber stresses used in proportioning the crane are 10,000 pounds per square inch in compression and 12,000 pounds per square inch in tension. A factor of safety of five is provided throughout the entire construction.

Cheap Steam Production.

A letter to the editor of *Engineering* (London), printed in a recent issue of that periodical, was provoked by an earlier letter asking whether the cost of 2 shillings 4 pence (56½ cents) for evaporating 1000 gallons of water can be beaten. The writer sends particulars of a test made at James Oakes & Co.'s Riddings Collieries, near Alfreton, England, on April 19 of last year. The



A New Design for a Hand Traveling Shop Crane.

crane has wide side bracing connecting out to the extreme ends of the end trucks.

The crane, as shown in the drawing, consists of a box girder grooved on the upper side and mounted at the ends on a pair of trucks, which are carried on 24-inch cast iron chilled tread wheels. The wheels are ground to run on standard track rails. The gearing consists of steel spur gears with teeth cut from the solid. The end truck wheels are provided with roller bearings. The general dimensions are as shown in the figure.

The lifting capacity of the crane is 15 tons and the height of lift is 15 feet. The bridge travel is operated by means of a hand chain working on a 36-inch sprocket wheel, which is geared through a series of reduction gears to one pair of the truck axles. The shaft to which this sprocket is geared runs along the length of the crane, and is supported at intermediate points on the frame of the crane. The trolley movement is obtained by pulling on the suspended hoisting block. The lifting is accomplished by a 15-ton triplex hoisting block, which is operated by pulling on a 3/8-inch chain, which is part of the block mechanism.

The trolley is made of four single flange 10-inch chilled tread wheels, supported by bent plates that are curved in

plant consisted of a Lancashire boiler fitted with two patent hot air furnaces, supplied by the Hot Air Furnace Company, Birmingham, England, and one of its down-take superheaters. The following is the data given:

Size of boiler.....	8 feet diameter by 30 feet long.
Average boiler pressure.....	80 pounds.
Temperature of saturated steam.....	324 degrees F.
Temperature of superheated steam.....	540 degrees F.
Degrees of superheat.....	216 degrees F.
Temperature of feed water entering economizer.....	90 degrees F.
Temperature of feed water entering boiler.....	250 degrees F.
Temperature of gases entering economizer.....	540 degrees F.
Temperature of gases entering chimney.....	230 degrees F.
Pounds of water evaporated per hour (actual).....	9,768
Pounds of water evaporated and superheated per pound of coal (actual).....	9.5
Equivalent evaporation of saturated steam from and at 212 degrees pound of water per pound of coal.....	12.2
Class of fuel.....	Dirty slack.
Cost of fuel per ton at colliery.....	48½ cents.
Actual cost of fuel to generate and to add 216 degrees F. of superheat to 1,000 pounds of steam.....	2 1/4 cents.
Equivalent cost of fuel to generate 1,000 pounds of steam from and at 212 degrees.....	1 1/4 cents.

This shows that the actual cost of the fuel to generate the steam from 1000 gallons of water and superheating it 216 degrees is but 11 1/4 pence (22½ cents), as compared with 1 shilling 11 pence (about 46 cents) for the generating of steam in the boiler previously referred to.

Oil as Fuel for Core Ovens.*

BY S. F. BARNEs, HOLYOKE, MASS.

Natural gas is the ideal fuel for use in core ovens. When, however, gas fuel is not available it is necessary to choose between coal and coke. Of the three fuels coal is the least desirable for the average core oven, on account of the uncertain quality of heat obtained, due to draft or otherwise, the time in getting up the necessary heat, as well as the expense of labor in bringing up coal to the oven and the cleaning and removal of ashes. Coke is somewhat better than coal, as the heat produced is good, when you get it. Coke requires less draft than coal, which generally results in a hotter oven, but the expense of handling both coke and ashes is very nearly the same as with coal. While these two fuels have served well in the past and will continue to do so in the future, I feel certain that they must give way in time, to some extent, to a more modern, economical and convenient fuel.

The use of oil as fuel for the core ovens at the plant with which I am connected will therefore be the sub-

walls about 1 inch thick. Connecting one end with the water supply and the other with the air (or now the steam) end of the burner, the generator was then placed in the oven, under the burner, the front end being flush with the outside wall of the oven. Air was used to start the operation with this system. In order to get steam pressure to replace the air it was only necessary to turn on the water, which entered the generator through a needle point valve, permitting only a small stream of water, which instantly generated very hot, dry steam, the pressure of which could be regulated by the amount of water (city pressure being used) allowed to enter the generator.

Thus we have the steam to run the fire continuously, but when there is no air there is nothing to feed the oil to the burner, as the steam is only used to spray the oil into the oven after both have been brought together under different pressures. The pressure for the oil in this case was obtained by connecting the oil tank with the city water pressure, which entered at the bottom of the tank, forcing the oil, which is the lighter, to the top of the tank, whence it was conveyed to the burner. This crude system was used for some time, bringing the cost

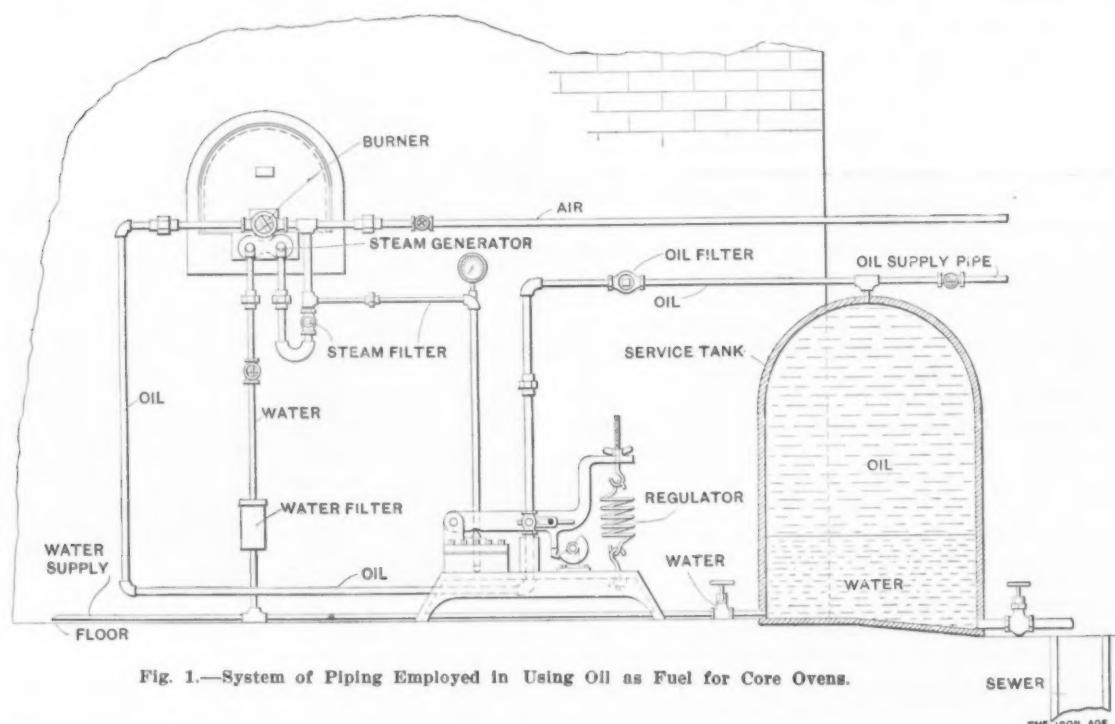


Fig. 1.—System of Piping Employed in Using Oil for Core Ovens.

THE IRON AGE

ject of this paper. Its application was begun some three years ago, when it was decided to aid the core makers, whose production, owing to limited oven facilities, was restricted. At that time oil was applied to the use of two ovens and to the use of oil burning torches. As the writer became better acquainted with the use of oil it was found that with torches the drying of blackening and joints on large cores could be very readily done, while previously it had been necessary to put these cores in the ovens two or three times in order to finish the work. Large patches can be made on cores by putting on thin layers and drying each in turn with the torch, a method which would almost have been prohibitive in cost, if accomplished by drying in an oven. We also use the torch to skin dry molds, for heat and light in emergency cases and for a number of varied purposes.

The first method of burning oil was by means of compressed air, but as the ovens were run at night when the rest of the shop was not operating it was difficult to obtain sufficient air for our work. It was therefore necessary to devise a new method. I had often observed the rapidity with which steam was generated by throwing a small amount of water on hot iron or in a hot pipe, and, acting on this principle, I made a cast iron return pipe, about 3 feet long, internal diameter $\frac{3}{8}$ inch, with

of fuel down to the actual cost of the oil. It was found, however that to make this system complete it would be necessary to regulate the flow of oil in proportion to the steam pressure, which might range from 1 to 40 pounds per square inch.

In order to do this a diaphragm regulator was remodeled to suit the purpose, as shown in the accompanying drawing, Fig. 1. The steam pressure thus acted on a lever which automatically opened and closed the oil supply, which is by this means fed to the burner only in exact proportion to the steam pressure, preventing any unequal mixing of oil and steam, whereby any explosive gases might be formed. Should the steam pressure cease, by any accident or otherwise, the oil valve will be instantly closed and locked by means of a cam device, and it is not possible to get any oil to the burner again until this lock has been thrown open by the operator. This avoids any possible accidents from explosive oil mixtures.

In this whole system the operation is controlled entirely by one valve—the water valve—which, upon opening, permits water to enter the generator, steam being generated, which acting on the oil pressure regulator permits sufficient oil for the pressure of steam to enter the burner. All other valves are therefore either secondary or precautionary.

A system of piping for one of these oil burners is also

* Read before the Philadelphia Foundrymen's Association, January 4.

shown in Fig. 1. For our purposes the oil tank has a capacity of 90 gallons of fuel oil. An oil filter is placed between the tank and the regulator valve, which will catch all pipe scale or other dirt that would be large enough to interfere with the oil valve or the burners. This valve permits of ready cleaning. The pressure of oil is regulated by a spring, the tension of which is adjusted by a thumb screw. The water entering the generator is filtered through fine gravel, to prevent rust and dirt from stopping the flow of water through the small needle valve. This filter is so connected by valves that it may be readily cleaned by reversing the flow of water as often as may be necessary. An air filter is also used, to prevent dirt from reaching the burners when the generator is started, the steam being filtered as it comes from the generator for the same reason. The burner used in the device is the usual type of mixing oil burners supplied by the trade. The construction of the furnace and other portions of the apparatus is shown in Fig. 2. In this illustration A A is the door frame, one piece, cast iron; B B, the generator section through center; G, the burner; D, the cast iron arch over fire entrance, which helps to ignite the oil and directs the flame toward the back wall of the furnace; E, the igniting block, of solid cast iron, placed on the top of the generator directly in front of the burner nozzle, the oil

fue only was needed in the oven with this system, an 8 x 8 inch opening being the largest that has been used. Four tons of sand are, on the average, dried each night in each of these ovens. The piping in the system can be made of $\frac{1}{2}$ -inch pipe, which will give good results. The entire cost of maintenance of this system was said to be 16 cents per hour.

Pacific Coast Trade.

SAN FRANCISCO, CAL., January 7, 1905.—The exact amount of pig iron imported for the year has been 24,745 gross tons, which is smaller than the importations of 1903. This was not because there was any less consumption during the past year, but considerable stock was carried over from the year preceding. The disturbance occasioned by the failure of Seymour R. Church has passed, and he has an office with Wilson, Meyer & Co., where the estate is being liquidated. The loss to the several creditors will be reduced to a minimum. As a rule prices during 1904 have favored the buyers here as elsewhere, while the quantity of pig iron here and to arrive involved in the settlement of this estate also contributed to the same result. The quantity of pig iron and scrap iron that will be needed by our manufacturers this year will be considerably larger than that used in 1904, unless all present signs fail and the crops disappoint the expectations at present entertained of them. As the tendency of the Eastern markets is toward improvement and better prices, we may expect a greater proportion of that used here to come from foreign countries. Sweden is beginning to show up as a source of supply, albeit the amount received from there is as yet very small.

The extensive production and low prices of oil tend to reduce the cost of manufacturing and have given a considerable impetus to manufactures in this State. The producers are discouraged because the price offered toward the end of the year was only a little over 11 cents per barrel, and the Associated Oil Company, acting as is believed, for the Standard, would not guarantee to take the product of the wells even at this price. There will doubtless be a much larger production of oil this year, certainly about 35,000,000 barrels, and it would be larger still but for the lack of a market. Inasmuch as values manifested on outgoing vessels range all the way from 75 cents to \$1.20, it would seem as if a much better price should be afforded to the producer and at the same time give the manufacturer a chance. Until these things are settled the manufacturers of the State will not derive as much benefit from its abundant oil production as they might and ought. The importation of coal for the year was a little over 1,000,000 tons, a conspicuous falling off in the past three years—in fact, an absolute falling off of nearly one-half since 1901. This has been replaced by fuel oil.

During the past two weeks we have had abundant rains in every section of the State, even the south, which was as usual complaining, receiving a thorough wetting down. From Tehachapi to the Mexican border the result has been to place everything in the farming and fruit growing line in excellent condition; also to favor the mining people with sufficient water for the working of their mines.

There has been a lull in the hardware and iron trades, owing to the holidays and stocktaking. Some lines, however, still enjoy a large demand on account of the necessities of those engaged in the building trade, which is as active as ever. The actual value of the building contracts during 1904 in this city was \$16,916,118, of which nearly one-third consisted of steel frame structures. An increase of \$3,000,000 was made over 1903, and a gain of more than threefold in the last 10 years. The first week of the year, which is generally quiet, has started in with new contracts valued at \$315,978.

The export trade of this port to foreign countries and the Hawaiian Islands for the year exceeded \$53,000,000, an increase of over \$3,000,000 when compared with 1903. The imports for 1904 were in round numbers \$46,000,000, or about \$6,000,000 in excess of the previous year.

J. O. L.

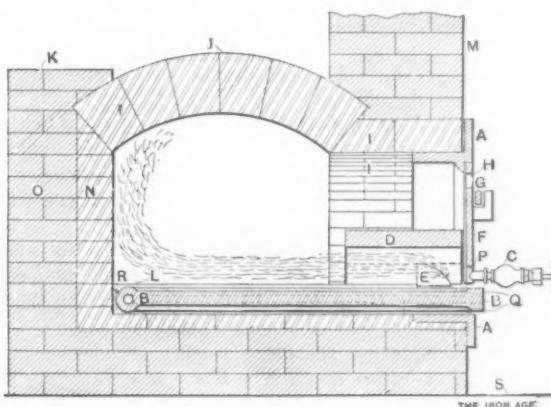


Fig. 2.—Vertical Section through the Center of the Oil Burning Furnace for Core Ovens.

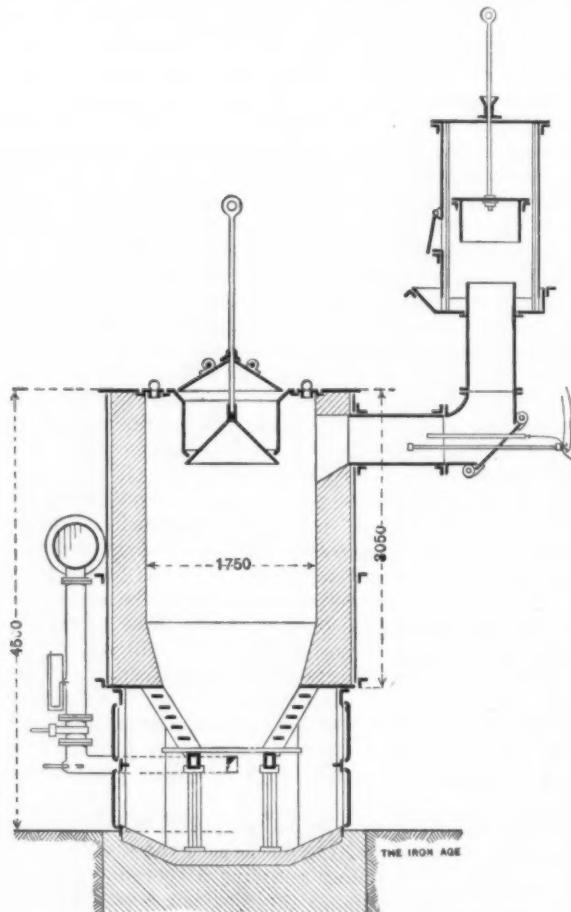
gas striking it and becoming ignited; F, the door, one piece cast iron, held in position by the bar G; H, the peep hole in the door; I I, the furnace door arch; J, the arch over the fire chamber; K, the back wall of the furnace; L, the furnace floor line; M, the front wall of the oven; N, section lines representing fire brick; O, section lines representing common red brick; P, the opening for the burner nozzle; Q, the gutter, top and bottom of generator, for drippings of oil that may come from burner, the gutter carrying the drippings into the furnace, where they are consumed; R, the space in the furnace floor in which the generator is placed; S, floor line outside of oven. This line should be 5 feet from peep hole at H.

This system of burning oil is the cheapest, because it is maintained by a small amount of water at city pressure. The cost of oil for two ovens, two burning torches and a large babbitt kettle, the latter used almost continuously throughout the day, is less than the actual cost of coke for the two ovens, no labor expenses being added. This system has special advantages in that it can be utilized at any time without the operation of any machinery. The apparatus is easily kept in repair, the generator being the only part which wears, or rather burns, out. The life of these generators is about two months, and they can be replaced by one man and a helper in half an hour. These generators weigh about 125 pounds and are made of gray iron.

In the discussion following the paper Mr. Barnes explained that 85 or 90 gallons of oil were sufficient for their two ovens—each 9 x 16 x 10 feet inside—in connection with the torches, &c., above mentioned. A small

Experiments with Gas Producers.

The following is an abstract of a paper by Dr. Karl Wendt, published in the *Zeitschrift des Vereines Deutscher Ingenieure*. The author made three sets of experiments with different producers, coal being the fuel used in all cases. The first arrangement was that shown in the accompanying illustration, using air blast at a moderate pressure, while for the second, necessitated by the difficulty of keeping a clean grate, the latter was removed and the wall of the producer extended down 27½ inches, so that its lower edge dipped into water and formed a seal. The air was introduced through an 11½-inch pipe to the center of the apparatus, the end of the pipe being covered by a distributing cone, the lower edge of which was 19½ inches above that of the shell. This arrangement was also unsatisfactory, owing to the formation of slag, so a steam jet blower was installed, other details being left unchanged. The steam was highly superheated by being passed through five coils of pipe laid inside the upper part of the producer. To obtain the most favorable results it was found necessary to greatly reduce the air openings of the blower, or, in other words,



Cross Section of Gas Producer Used in First Experiment.—Dimensions in Millimeters.

to use more steam than would be required for the most economical operation of the same.

The reactions taking place within a gas producer may be divided as follows:

1. The tar and other organic constituents of the fuel are transformed into the gaseous state. The heat needed for this reaction is designated Q .

2. Air is blown in, accompanied invariably by moisture, adding the latent heat of the latter, and also the heat absorbed in raising the temperature of both above that of the atmosphere. This heat addition is designated Z .

3. The excess of hydrogen, not used in the formation of gas, burns to H_2O with a gain of heat W_1 ; correspondingly if more hydrogen is needed, it is formed by decomposition with a loss of heat W_2 .

4. The elements present are resolved into the following:

a , gas, with heat of formation Q_g ;

b , ashes, with heat of formation, Q_r ;

c , soot, practically pure carbon, of which the heat of formation may be disregarded.

5. Moisture present in the producer is converted into steam with a loss of heat (irrespective of increased temperature) D .

6. The excess heat still available is used,

a , to raise the gas from the temperature of the atmosphere to that at which it leaves the producer, requiring an amount of heat G ;

b , to raise the ashes and, in Experiments II and III, the water removed with them from atmospheric temperature to that at which they are taken out.

7. The remaining heat S is lost by radiation and conduction.

The heat equation will therefore read:

$$Q + Z + W + Q_g + Q_r - D - G - R - S = 0;$$

or,

$$Q_g + Q_r + W + Z = Q + D + G + R + S.$$

In this equation all the factors with the exception of S may be determined by experiment and calculation, so that the value of S may be obtained by difference.

A check on the latter is available by reason of the fact that the amount of heat put into the producer must be equal to that contained in its products, together with that lost by radiation, &c. For a given unit of coal charged into the producer there are added to it:

1, the heating value of this unit, equals H_k calories;

2, the heat and superheat of the steam and air required, equals Z calories.

The products of the producer, the removal of which absorbs heat, are:

1, gas, of which the heating value, H_g calories, and the increased temperature, G calories, represent the total heat, $H_g + G$ calories, removed with the same;

2, ashes, containing combustible matter with heating value H_r calories, and with an increased temperature equivalent to R calories, the removal of which therefore entails a total loss of $H_r + R$ calories.

A second equation therefore reads:

$$H_k + Z = H_g + G + H_r + R + S.$$

Here, too, every factor but S (loss by radiation, &c.) may be determined by experiment.

The following table shows the figures used for the weights, specific heat and heating values of the various substances:

	Weight of 1 c. m. at 0° C. and 760 mm. Specific heat Kilos. Calories.	Upper heating value		Lower heating value	
		of 1 kilo.	of 1 c. m.	of 1 kilo.	of 1 c. m.
H	0.08957	3.409	34.180	3.062	28.780
CO	1.251	0.245	2.428	3.037	2.428
CO ₂	1.977	{ 0.188 + } { 0.000167 t }	.....	.....	.....
CH ₄	0.7155	0.593	13.244	9.476	11.894
N	1.2562	0.2438	.....	.....	.....
O	1.4298	0.2175	.....	.....	.....
C	.....	.....	8.080	.....	8.080
S	.....	.....	2.500	.....	2.500
Air	1.2932	0.23751	.....	.....	.....
Water	1.000	1.0	.....	.....	.....
Steam	.....	{ 0.421 + } { 0.000364 t }	.....	.....	.....
Ashes	.....	0.25	.....	.....	.....
Coke	.....	0.25	.....	.....	.....
Tar	.....	0.45	.....	.....	.....

The experiments were most carefully carried out, all temperatures, pressures, &c., being taken hourly, and a great number of analyses and calorimetric tests made.

The coal used showed the following composition and heating value:

Composition of the coal:	Experiment number.		
	Per cent.	Per cent.	Per cent.
C	57.86	57.21	58.14
H	3.72	3.67	3.38
S	0.70	0.69	0.40
O	9.20	9.10	9.60
N	0.60	0.60	0.70
Moisture	9.40	10.42	10.05
Ashes	18.52	18.31	17.73
Totals	100.00	100.00	100.00

	Calories.	Calories.	Calories.
Upper heating value.....	5,585	5,522	5,598
Lower heating value.....	5,328	5,261	5,355
Composition of dry combustible matter:	Per cent.	Per cent.	
C	80.26	80.50	
H	5.16	4.68	
S	0.97	0.55	
O + N	13.61	14.27	
Totals.....	100.00	100.00	
	Calories.	Calories.	
Upper heating value of dry combustible.....	7,749	7,751	

Following is a summary of the results and conclusion:

	Experiment number.		
	I.	II.	III.
Duration of experiment, hours	48	51	71
Total coal used, kilos.....	14,460	13,920	14,760
Coal used per hour, kilos....	301	273	208
Average temperature, C.....	8.5	9	10
Average barometer, millimeters mercury	747	748	750
Average temperature of blast, C.....	21	21	73
Average pressure of blast, millimeters water.....	70	68	....
Average moisture in cubic meters blast, grammes.....	7.25	6.24	140
Average steam pressure, abs. atm.....	....	3.83	
Average superheat, C.....	....	354	
Average temperature of water in seal, C.....	....	49	45
Average temperature of gas, C.....	649	638	520
Dry ashes, per cent. of coal charged	22.27	16.80	14.36
Combustible in ash, per cent. of coal charged.....	6.43	2.54	1.64
Water removed from seal per 100 kg. coal charged, kilos.....	....	9.23	8.59
Average composition of gas by volume, per cent.:			
CO ₂	0.67	0.85	5.40
CO	31.13	30.65	27.01
CH ₄	2.40	2.55	2.93
H	6.57	7.10	14.55
N	59.23	58.85	50.11
Average upper heating value of 1 c. m. pure gas, calories 1,353	1,408	1,549	
Average lower heating value of 1 c. m. pure gas, calories 1,298	1,340	1,451	
1 c. m. gas contains:			
Water, grammes.....	70.57	71.60	87.0
Tar, grammes.....	13.47	17.90	15.35
Flue dust, grammes.....	5.20	6.30	0.95
Weight of 1 c. m. pure gas, kilos	1.16979	1.16412	1.10815
Weight of 1 c. m. uncleaned gas, kilos.....	1.25903	1.25902	1.21145
Specific heat of 1 c. m. uncleaned gas.....	(0.34659 + 0.0000279 t)	(0.34959 + 0.0000289 t)	(0.35686 + 0.00005 t)

Using the above data, the following figures are obtained:

	Experiment number.		
	I.	II.	III.
Gas from 100 kilos coal, cubic meters 265.35	277.33	280.3	
Air from 100 kilos coal, kilos.....	255.0	264.86	227.71
Steam formed or disassociated per 100 kilos coal, kilos*.....	+6.7833	+2.7468	-18.2682
Steam from water seal per 100 kilos coal, kilos	0.98	5.29	6.31

* In experiments II and III there was derived from the coal an excess of hydrogen, which is burnt to water with development of heat. In experiment III, on the contrary, there is an excess of steam, which must be disassociated with an accompanying absorption of heat.

These values are used for calculating the "Heat Balance," with the following result:

	Experiment number.		
	I.	II.	III.
A. Factors giving heat:	Calories.	Calories.	Calories.
(1) Formation of the gas, Q _g	120,734	127,017	171,824
(2) Combustion of excess free hydrogen, W 1.....	25,761	10,432	....
(3) External sources, Z:			
(a) Excess heat in air owing to its temperature being higher than that of the atmosphere	757	755	....
(b) Latent heat of water vapor in the blast.....	942	840	1,194
(c) Heat of steam operating blower .....	....	....	11,558
(d) Superheat of same.....	....	....	2,648
Totals.....	148,194	139,044	191,224

B. Factors absorbing heat:				
(1) Decomposition of the coal, Q	29,553	20,221	29,610	
(2) Formation of the steam contained in the gas, D	11,232	11,914	14,634	
(3) Raising temperature of the gas above that of atmosphere, G	60,473	62,621	53,874	
(4) Raising temperature of the ashes and accompanying water above that of the atmosphere, R	5,567	537	426	
(5) Formation of 2,029 kilos hydrogen by disassociation of steam, W 2 .....	....	....	60,370	
(6) Radiation and conduction, S	41,369	34,751	23,301	
Totals.....	148,194	139,044	191,224	

If the figures thus ascertained for loss by radiation and conduction are inserted in the second equation:

$$H k + Z = H g + G + H r + R + S,$$

a check is obtained as follows:

	Experiment number.		
	I.	II.	III.
Sources of heat:	Calories.	Calories.	Calories.
(1) Combustion of 100 kilos coal.			
HK	558,500	552,200	559,800
(2) External sources, Z	1,690	1,595	19,400
Totals.....	560,190	533,795	579,200
Disposition of heat:			
(1) Heating value of clean gas, Hg. 359,018	390,481	434,185	
(2) Latent heat of steam in gas, Hg. 11,232	11,914	14,634	
(3) Heating value of tar in gas, Hg. 28,381	39,432	34,185	
(4) Heating value of soot in gas, Hg. 1,535	1,858	291	
(5) Sensible heat of gas and impurities, G	60,473	62,621	53,874
(6) Heating value of combustible matter in ashes, Hr	51,794	20,460	13,210
(7) Sensible heat of ashes, R	5,567	537	426
(8) Radiation and conduction, S	41,369	34,751	23,301
Totals.....	559,639	562,054	574,106

From the above it will be seen that the results obtained by the two methods are in substantial agreement.

If the figures relating to the disposition of the total heat available are expressed in percentages of the same, the following interesting results are obtained:

	Experiment number.		
	I.	II.	III.
Per cent. Per cent. Per cent.			
The total heat available in the producer is distributed as follows:			
(1) Heating value of the clean gas 64.18	69.47	75.63	
(2) Latent heat of steam in gas.. 2.01	2.12	2.55	
(3) Heating value of tar in gas.. 5.07	7.02	5.95	
(4) Heating value of soot in gas.. 0.28	0.38	0.05	
(5) Sensible heat of gas and impurities	10.81	11.14	9.38
(6) Heating value of combustible matter in the ashes.....	9.26	3.64	2.30
(7) Sensible heat of ashes.....	1.00	0.10	0.08
(8) Radiation and conduction.....	7.39	6.18	4.06
Totals.....	100.00	100.00	100.00

Calculation shows that, for the production of the blast, fuel was consumed at the boilers for each 100 kilos charged into the producer, equivalent to 1510 calories in Experiment I, 1520 calories in Experiment II and 25,930 calories in Experiment III. These figures, which would modify those of the two preceding tables, would have to be taken into account in calculating the relative efficiency of gas producers.

In weighing the results of experiments such as those described above, much will depend on the purpose for which the gas is required. For use in gas engines it would be necessary to sacrifice the sensible heat of the gas and also the heating values of the impurities because of the inevitable washing process, while for most metallurgical purposes the same could be utilized. The German author, however, expresses the opinion that even in the latter case it would often be more economical to remove the moisture and impurities by cooling and washing, as more favorable results on the life of the furnace would thereby be obtained, and the loss would be recovered in a measure by avoiding the necessity of raising the temperature of the accompanying water vapor when combustion occurred.

The Minister of Railways in Austria has ordered from the Austrian rail syndicate 40,000 tons of steel rails at prices varying from 172 to 180 crowns per metric ton. This is roughly equivalent to \$40 per ton.

The Lawrence Spherical Pump.

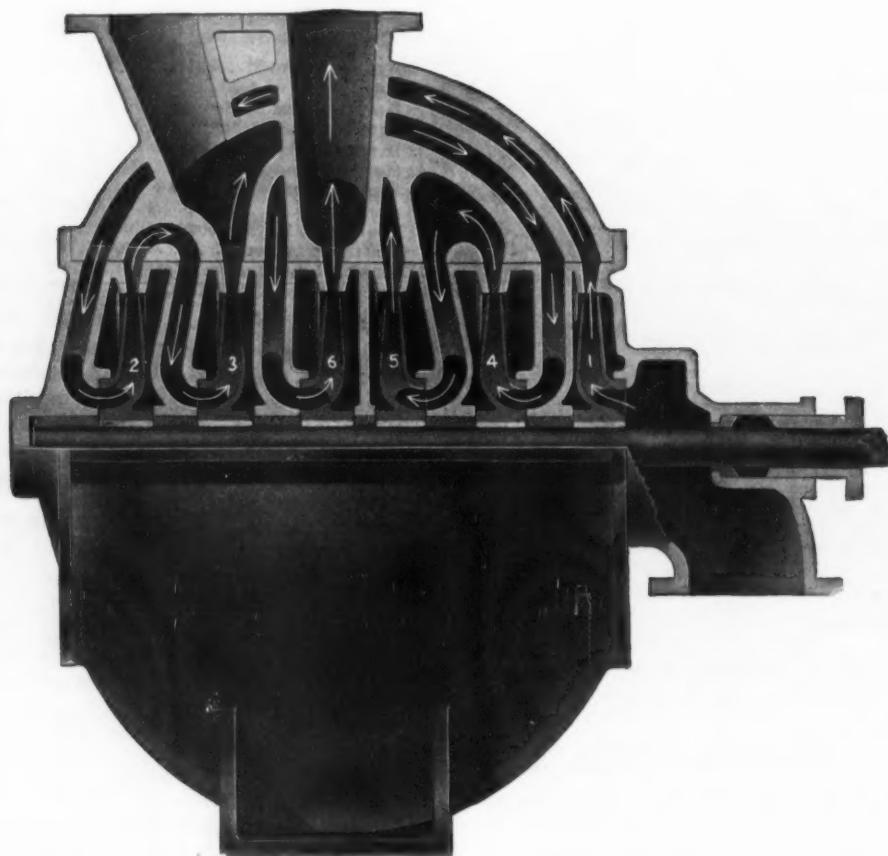
A compound or multi-stage pump, which from its shape has been given the name of "spherical" by its builder, the Lawrence Machine Company, Lawrence, Mass., is shown in the accompanying illustration. The new feature of the pump, which is the invention of William O. Webber, Boston, Mass., is the arrangement of the impellers 1, 2, 3, 4, 5 and 6 and the course of the water through the impeller chambers, as indicated by the arrows, which obviates the necessity of artificial means for balancing the end thrust upon the shaft. This balance is constant, irrespective of variations in the suction lift or discharge height above the axis of the pump—*i. e.*, the opposing forces parallel with the shaft are always equal.

Two pressures exist in each impeller, that of the inlet, or suction, and that of the outlet, or discharge. Assuming that each impeller gives an additional pressure of 20

which the speed will be low enough to avoid excessive friction between the periphery of the revolving impellers and the more slowly moving liquid in the vortex passages. The pump is designed for all sorts of high lift work. The one illustrated is arranged to give two pressures if desired, and for that reason has an additional outlet leading from the third stage, where the pressure is just half the pressure delivered from the last outlet.

The Halcomb Steel Company.

The manufacturing industries of Syracuse, N. Y., are to be further augmented by a crucible steel plant which is to be erected by capitalists of that city whose prominence in commercial life and experience in the steel business or allied lines assures the successful establishment of the enterprise. The project was first talked of in a general way in 1903, but the plans had not sufficiently matured to



The Compound Multi-Stage "Spherical" Pump. Built by the Lawrence Machine Company, Lawrence, Mass.

pounds, then impeller 3, for instance, will have an inlet pressure of 40 pounds and outlet pressure of 60 pounds. The reacting force on each impeller is the same, and the components in an axial direction are all equal. Thrust balance is therefore obtained by turning three of the inlets in one direction and three in the other. The impellers are also balanced on the shaft, so that when revolving at high speed there is no tendency to spring the shaft, and what pressure there is on the bearings would be practically uniform and very slight if it were not for the means of driving. Electric motors or any direct connected drive are best. Where the pumps are to be belt driven bearings are necessary, and ample ones are provided, but the balanced condition of the revolving element removes the necessity of inside bearings in all cases, which, it is claimed, results in greater economy in power and a saving in wear of parts and in construction.

The new Lawrence pump, like most others of its type, is provided with diffusion vanes at the periphery of the impellers, and the liquid passes through long easy passages of uniform cross section. The pump is built in combinations of even stages, 2, 4, 6, 8, 10, &c., so that one may be selected for almost any discharge pressure, in

be made public until a few days ago, when the company was incorporated as the Halcomb Steel Company, with a capital stock of \$460,000, all of which has been subscribed. A plant for the manufacture of high grade crucible steel is to be built on a site which will provide ample room for expansion, it being the intention of the management to enlarge the works from time to time as the trade demands. Those interested are confident that there will be a large demand for the company's product and stand ready to furnish all the capital necessary for any desired extensions. The plans provide for the construction of a plant sufficient in proportions to give employment to from 500 to 1000 men when in full operation.

The entire capital stock of the company has been underwritten by five prominent business men of Syracuse, among whom the best known in the iron and steel trade is probably C. Herbert Haleomb, who will be the general manager of the business. Mr. Haleomb brings to the new company valuable experience and an intimate knowledge of the manufacture of crucible steel, gained by his long association with that branch of the steel business. For seventeen years, beginning with 1883, he managed the Sanderson Brothers Steel Works at Syracuse, and when

that company was taken over in 1900 as a constituent company of the Crucible Steel Company of America he was chosen president of the consolidation, which office he held for two years, when he withdrew.

The other four gentlemen interested in the enterprise—Lyman C. Smith, Frederick R. Hazard, F. B. Scott and H. S. Wilkinson—have wide and varied business interests, being connected with many large concerns. Mr. Smith is president of the Lyman C. Smith & Brothers Typewriter Company, Hudson Portland Cement Company, United States Transportation Company, L. C. Smith Transit Company, Rochester, Syracuse & Eastern Company, Palisades Land Company, National Bank of Syracuse, and a director of the Auburn & Syracuse Company. Mr. Hazard is president of the Solvay Process Company, Syracuse Trust Company, Chamber of Commerce, and a director of the Tully Pipe Line Company, Split Rock Cable Company, Semet Solvay Company and the Commercial Bank.

The Monongahela River Consolidated Coal & Coke Company.

At a meeting of the directors of the Monongahela River Consolidated Coal & Coke Company held in Pittsburgh last week a dividend of 77 cents a share was declared. The report for the year just closed is as follows:

We have passed through a year of trying and unusually severe conditions. Floods and ice gorges, followed by six months of low water, accidents incident to marine transportation, which no care or precaution can prevent, have been bunched the past year, making it at times impossible to operate the mines or to transport the coal when loaded, and have resulted in unusual loss of life and property. These conditions coming in a year of industrial depression have resulted in cutting down the company's revenues and increasing its expenses. The statement of the earnings for the year follows:

Profits, after deducting all expenses, bad debts and other losses.....	\$1,727,767.33
Less maintenance and depreciation.....	706,002.60
	<hr/>
Interest, royalty, &c., on coal mined.....	\$1,021,764.73
	<hr/>
Balance for the year.....	\$866,998.50
Undivided profits October 31, 1903	\$1,958,668.55
Less dividend No. 8, paid Jan- uary, 1904.....	349,825.00
	<hr/>
Undivided profits.....	\$1,608,843.55
	<hr/>
Interest, royalty, &c., on coal mined.....	\$1,763,609.78
	<hr/>

It will be observed that after the payment of the above dividend the year's operations showed a deficit of \$195,058.77.

Liquid Assets.

	1904.	Increase.
Cash on hand and in banks.....	\$290,417.00	*\$24,104.70
Accounts and bills receivable....	2,950,499.47	*665,604.64
Coal on hand.....	1,973,587.79	*107,355.73
Supplies on hand.....	783,318.61	70,378.44
Current debt.....	2,162,785.41	*344,605.47
Excess of assets, \$3,835,037.78; decrease, \$452,459.60.		

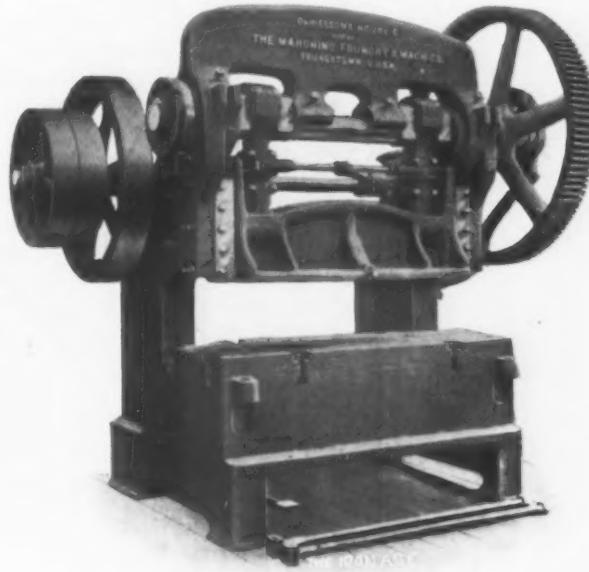
* Decrease.

The reports show that during the year \$95,000 of the bond issue has been paid and canceled, leaving \$9,255,000 outstanding. There is \$139,248.05 cash in the sinking fund to be applied to payment of outstanding bonds. Since the company's organization its fixed investments have increased \$581,217.13, and the bonded debt reduced \$745,000. There have been purchased on the Monongahela River 3511 acres of coal, while 3742 have been mined and 229 sold, making a decrease of 460. The statement of the coal mined in the Pittsburgh district each year by the company follows:

	Tons.
Year ended October 31, 1900.....	5,464,984
Year ended October 31, 1901.....	5,749,065
Year ended October 31, 1902.....	6,275,579
Year ended October 31, 1903.....	7,342,424
Year ended October 31, 1904.....	4,158,544
Ohio Valley Coal & Mining Company, year ended October 31, 1904.....	86,212
Corona Coal & Iron Company, year ended October 31, 1904.....	421,522

The New Danielson Power Press.

The power press illustrated herewith is of the deep throat, double crank type, designed especially to meet the requirements of sheet metal workers manufacturing specialties from light and heavy gauges. It is built by the Mahoning Foundry & Machine Company, Youngstown, Ohio, and is known as the Danielson No. 206 C power press, being a recent design of G. F. Danielson. The press is made in three sizes, 22 x 48 inches, 22 x 60 inches and 22 x 72 inches. The frame is of a very heavy design and is arranged so that on extremely heavy work two 1½-inch wrought iron bolts may be placed in the front of the frame to assist in withstanding the strain of the working stroke. The distance between the housings is 60 inches in the clear, and the opening in the bed is 14 x 60 inches, with an enlarged center opening 22 x 32 inches. The area of the top of the bed is 27 x 76½ inches, and the center part extends to the rear to correspond with the large opening in the bed. The distance back of the ram is 6 inches, and its adjustment is with safety 3 inches. The maximum height of the ram is 2 feet 1½ inches. Its



The New Danielson Power Press, Built by the Mahoning Foundry & Machine Company.

ends and bearing surfaces are scraped to a close fit with the frame and gibs which hold it in position.

The crankshaft is 6 inches in diameter and is made of high carbon forged steel. The pitmans are extra heavy and are connected by a system of gearing, enabling the operator to adjust the ram to the required vertical position and maintain it always in perfect alignment. The screws on the pitmans are oppositely threaded and have keyed to them bevel gears which are driven from bevel pinions on a horizontal shaft rotated at its center by means of a ratchet. The ratchet may be seen in the illustration and is actuated by the inserting of a handle. No wrench is required. The gears and pinions are all cut.

The driving shaft at the rear of the press runs continuously. It may be clutched to the gear which drives the crankshaft with a ratio of 1 to 7, giving the press a speed of 45 strokes per minute. The clutch connecting the driving shaft with the pinion is of high carbon steel and of an improved automatic block type. It has three engagements, sliding over two tool steel slit keys in the shaft, and is located on the outside end of the gear shaft. The clutch is controlled by the foot treadle at the front of the press on the right side. A foot lever is provided at the left side of the press which connects with a brake shoe and block.

When desired a gear guard is furnished to cover the driving pinion and part of the large gear. The bolster plate is 3½ inches thick and is made solid or with such openings as may be required to suit the work to be done. The total weight of the press is 27,000 pounds.

Experience With Large Gas Engines.*

The first gas engine used at Neunkirchen was a single acting, four-cycle machine, with a cylinder 27.56 inches in diameter by 33.46 inches stroke. It was built

by the Nuremberg Machine Company, and was intended to give 180 horse-power. Indicator diagrams showed 296.6 horse-power in the engine cylinder and 214.2 horse-power in the blowing tub, so that the mechanical efficiency was 72.2 per cent. Fig. 1 shows sections and ele-

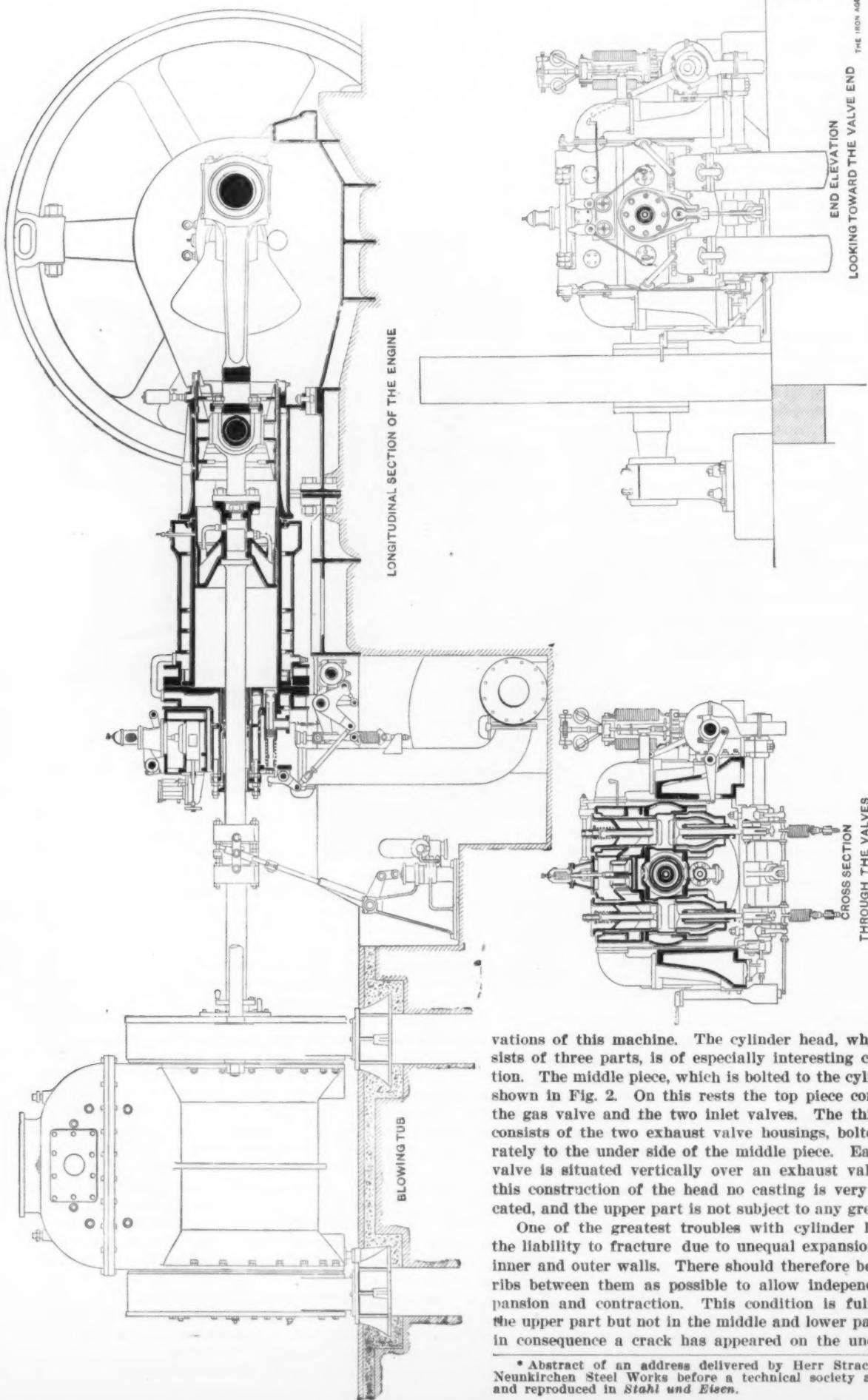


Fig. 1.—Sections and Elevations of the First Gas Engine Used at Neunkirchen, Built by the Nuremberg Machine Company

vations of this machine. The cylinder head, which consists of three parts, is of especially interesting construction. The middle piece, which is bolted to the cylinder, is shown in Fig. 2. On this rests the top piece containing the gas valve and the two inlet valves. The third part consists of the two exhaust valve housings, bolted separately to the under side of the middle piece. Each inlet valve is situated vertically over an exhaust valve. By this construction of the head no casting is very complicated, and the upper part is not subject to any great heat.

One of the greatest troubles with cylinder heads is the liability to fracture due to unequal expansion of the inner and outer walls. There should therefore be as few ribs between them as possible to allow independent expansion and contraction. This condition is fulfilled in the upper part but not in the middle and lower parts, and in consequence a crack has appeared on the under side

* Abstract of an address delivered by Herr Strack of the Neunkirchen Steel Works before a technical society at Treves and reproduced in *Stahl und Eisen*.

of the openings leading to the valves. A similar cause has had a similar effect in the back of the cylinder lining, where there are two cracks, which, however, do not extend beyond the width of the collar used to form a joint with the cylinder. None of the fractures have proved serious enough to necessitate replacing the defective castings.

The engine was at first governed by the governor acting on a cam which varied the lift of the gas valve. It was therefore a qualitative regulation, as the amount of air admitted remained unchanged while the gas was decreased. This arrangement has the disadvantage that, with a light load and little compression, the mixture is apt to become so weak that an explosion does not take place. In the present case there was no danger from this source, as the power being used for blast purposes the load was always sufficient to insure ignition. Later automatic speed regulation made its appearance and the governor was removed entirely. With the automatic system by the throttling action of the valve the gas is drawn in under a certain amount of vacuum. This throttling decreases with the speed of the engine, so that with the same valve opening more gas is taken in than when running faster, the mixture becomes richer and the engine soon attains a speed corresponding to its load.

At first several of the water cooled exhaust valves cracked, but since they have given little cause for complaint. When first installed the cooling water for piston and piston rod was supplied and carried away

furnace gas, is described. As it has not yet been delivered, however, the description is solely from drawings and specifications. The engine is of the two-cylinder, tandem type, the cylinders being 31.80 inches diameter, the stroke 39.37 inches and the speed 110 revolutions per minute. On a full load the mechanical efficiency is to be 84 per cent., and the consumption of gas, which is to have a minimum heating value of 450 British thermal units, is to be not more than 225 British thermal units per indicated horse-power hour. The cooling water must not exceed 8 gallons per indicated horse-power hour, with an initial temperature of 59 degrees F.

The general arrangement of this engine is as follows: The bed, which is supported by the foundation throughout its entire length, carries the cross head guides and the two crank shaft bearings. It is provided with a flange for bolting on the cylinder, and the latter is bored in one operation with the cross head guides, thus insuring their relative accuracy. Similar flanged connections are used for joining both cylinders to the middle piece and the rear cylinder to the rear guide. The stuffing boxes are so arranged that a certain amount of vertical movement of the piston rod can take place without injuring the packing. The valve housings are bolted on top of and underneath the cylinders. Water cooling arrangements are provided for pistons, cylinders, cylinder heads, exhaust valves and housings of the latter, and provision is made for easily cleaning all water spaces. As may be seen from Fig. 3, there are six valves on each cylinder—

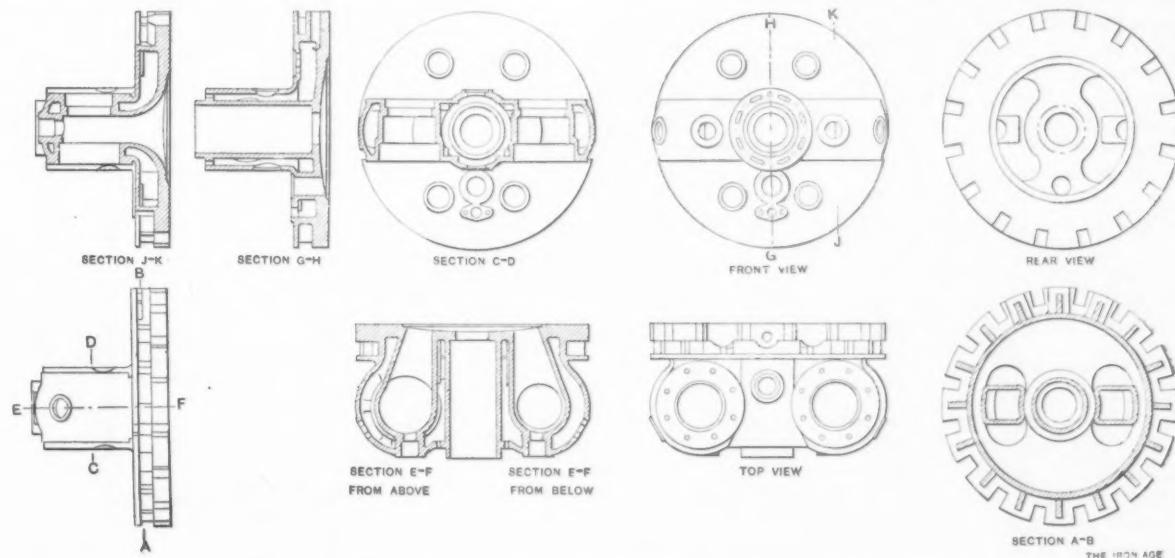


Fig. 2.—Detail of the Middle Part of the Three-Piece Cylinder Head in the Gas Engine Shown in Fig. 1.

through wire wrapped hose. This soon went to pieces and was replaced by the jointed pipes, shown in the drawing.

The blowing tub and engine are on separate foundations, only connected by two bolts at the level of the axis of the machine, and the piston rod has no outside supports. In consequence of this construction the movement of the heavy blowing piston caused oscillation of the tub, and this in turn caused rapid wear on the piston rod in the stuffing box of the power cylinder. The rod has now been renewed, having worn in three years from 6.69 to 6.25 inches.

It will be seen that this engine was by no means perfect, but after its numerous defects had been remedied it became a reliable machine. A tandem engine working on the same system was put into the Volklingen Works about the same time to drive an alternating current generator. This also caused much trouble at first, but is now giving satisfaction. Premature ignition has become a thing of the past since certain and easy means for keeping the cylinder head free from dirt have been provided, and the speed regulation is such that no difficulty is experienced in working in parallel with another installation.

A 1000 Horse-Power Four-Cycle Engine.

In order to show the progress made in building four-cycle gas engines, a 1000 horse-power, double acting machine of that type, recently ordered for use with blast

namely, a double seated gas valve, an inlet valve and an exhaust valve, both single seated, at each end.

The gas valve is of the self closing type, arranged to close at an invariable point of the stroke, while the time of opening is controlled by the governor according to the load. Gas and air are mixed at the gas valve, so that the space between the latter and the inlet valve is filled with explosive mixture. The inlet valve is positive, opened by a rod and closed by a spring. The exhaust valve, being incorrectly drawn in Fig. 3, is shown separately in Fig. 4, from which may be seen that housing, seat and valve are all water cooled. Valve and seat may be removed together by taking out the bolts of one flange, thus avoiding long delays. This valve is also closed by a spring, an arrangement of which the German author approves in this case, but condemns in that of the inlet valve.

The Koerting Two-Cycle Type.

The writer next describes engines of the Koerting two-cycle type, with the working of which he is familiar by reason of their installation at Neunkirchen. The first, a 600 horse-power engine, is shown by Fig. 5. The bed plate consists of a built up rectangular frame running the entire length. Both engine cylinder and blowing tub are supported along their horizontal center line, so that their expansion or contraction will not affect the piston rod. The rod is carried on special bearings in

front of the cylinder, between that and the blowing tube and behind the latter. Air and gas pumps are situated outside the engine frame, are driven by a crank disk at the end of the main shaft and have annular valves. The pump crank leads the main crank 180 degrees, and operates both gas and air pumps on a single piston rod. The air pump cylinder is filled completely at each half revolution, so that the amount of air is constant. The gas pump, on the contrary, begins to deliver its contents to the engine at varying points dependent on the load. In spite of this fact the governing is, according to the engine builder, quantitative, not qualitative, which is explained as follows:

There are immediately over the inlet valve two concentric spaces, through the outer of which air enters, while through the inner gas is admitted. Mixing therefore does not take place till both are entering the cylinder. When the main crank is still about 40 degrees from dead center the exhaust valve opens. At this time the pressure in the cylinder is 30 pounds or more per square inch, so that the products of combustion pass out with great rapidity, and when the crank is still 20 degrees from the center the pressure is but slightly above that of the atmosphere. The inlet valve now opens but at first admits air only, as the gas pump has not yet begun to deliver gas. The air, entering with a pressure of about 9 pounds per square inch, will naturally make for the open exhaust valve, driving the remaining combustion products before it. Gas does not begin to enter until the back part of the cylinder is filled with air. When once begun, however, the proportions of gas and air remain constant, being the same as the relative area of their respective pumps. The mixture in turn drives the air toward the exhaust valve, which, however, closes when the crank is about 40 degrees beyond the center, and shortly afterward the inlet valve closes also. According to Koerting, there is now in the cylinder a layer of air, and behind it a layer of explosive mixture, containing an invariable percentage of gas. When the load is heavy the gas pump begins to work earlier, and the layer of air is comparatively thin, but becomes thicker as the load decreases. The cylinder head is designed to assist this action. It has been frequently objected that this formation of layers is impossible, owing to the property of diffusion possessed by all gases, but it must not be forgotten that for diffusion to take place more time is necessary than is available under the circumstances.

The exhaust and inlet valves being closed the content of the cylinder is compressed by the piston. About 18 degrees before the center is reached ignition occurs, followed by simultaneous compression and combustion until the end of the stroke. Very shortly after the center is passed combustion is complete and the expansion takes place. At the end of the expansion stroke the exhaust again opens and the series of operations begins anew. The same thing takes place at the other end of the cylinder.

In the first engine at Neunkirchen the inlet valve was opened by a cam on the valve operating shaft, and closed by a strong spiral spring, which caused much trouble by breaking and sticking. The piston in the power cylinder was also a source of great annoyance. Owing probably to too great compression the wear on the rings was very great, and fractures occurred frequently. It was also very difficult to keep the piston water tight, with the result that it became hot in spots and caused premature ignition, the reason for which it took a long time to determine. Cylinder lining and mantle were cast in one piece, and the former being subject to greater heat than the latter, and being rigidly held at the ends, expanded in the middle, where, on account of the exhaust openings, the resistance was least. This seemed very serious on account of the danger of a broken piston ring catching in one of the openings, but when this actually took place the ring was sheared off without causing further danger. Pieces of piston ring have been found in the cylinder which had been thrown to and fro till they were rounded like pebbles. Other parts of the engine have run satisfactorily.

The Koerting engine was indicated in the power cylinder, blowing tub, gas and air pumps simultaneously.

Experiments with a 600 Horse-Power Koerting Gas Blowing Engine.

* Percentage of total power produced.

From the results shown in the accompanying table it may be seen that the pumps consumed in the least favorable test 17 per cent. of the indicated work in the engine

cards, between the suction and exhaust lines, which amount is about 8 per cent. of the positive work. The diagrams show, however, that in the engine under discuss-

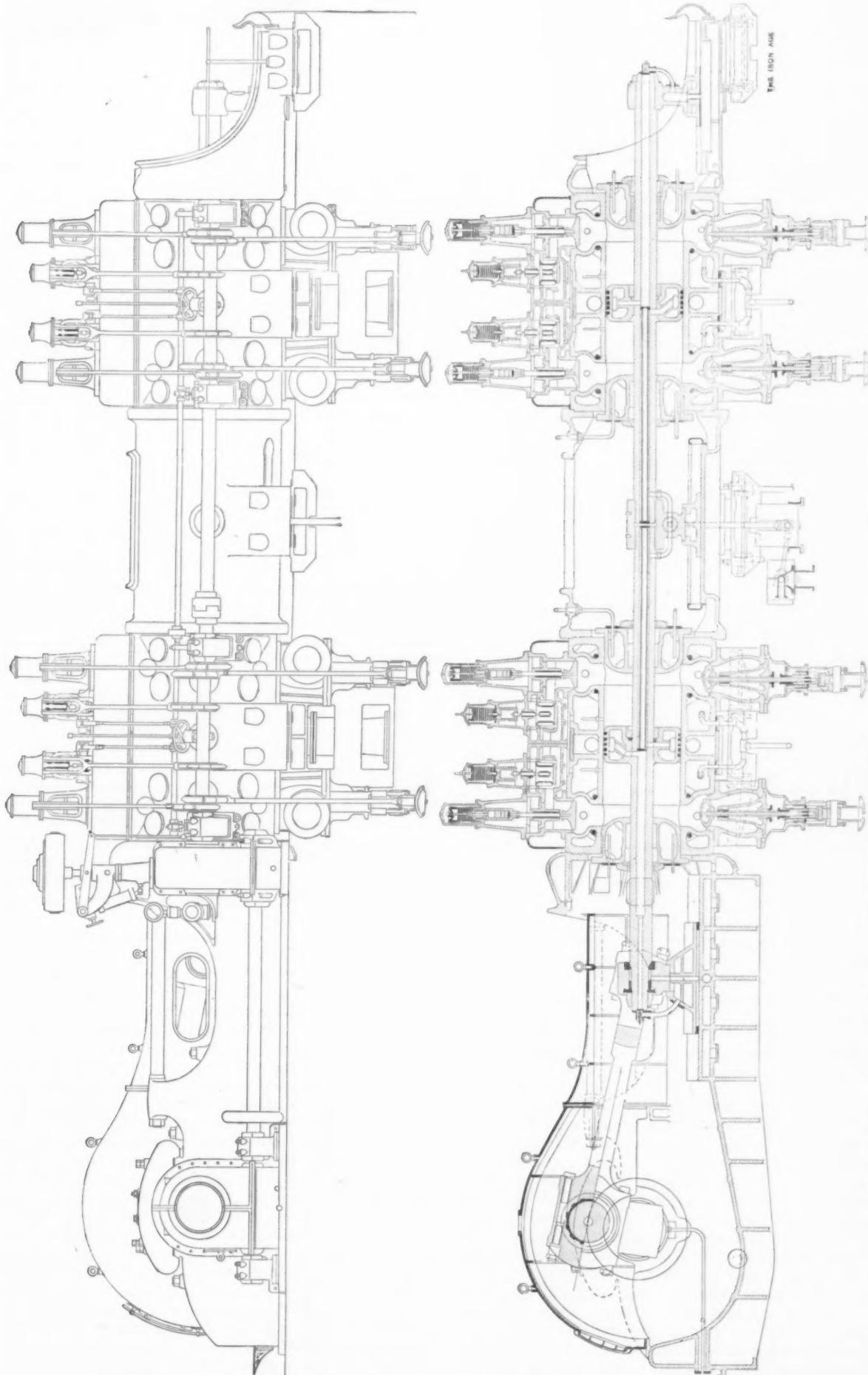


Fig. 3.—Elevation and Section of a 1000 Horse-Power Gas Engine Recently Ordered from the Nuremberg Machine Company, for Neunkirchen.

cylinder and in the most favorable 11.5 per cent. In four-cycle engines the power consumed by the pumps is replaced by the negative work, shown on indicator

sion the work of the pumps is unnecessarily great. The same could be much reduced by shortening the long pipe through which air is drawn from outside the building and

enlarging the passages through which the compressed air and gas pass to the cylinder. The pumps of two-cycle engines are not therefore so bad as they are sometimes represented. A minor evil of engines of this type is the violent and noisy exhaust, due to the fact that the cylinder must be cleared while the crank is revolving 80 degrees, whereas in the four-cycle engine a half revolution is taken up for the purpose.

The experience gained with this engine was available when the second one of the same type, an 800 horsepower blast furnace blowing engine, was installed at Neunkirchen. Some of the principal changes were in the gas and air pumps, the relative positions of which were reversed, the former being placed nearest the shaft. The long air suction line was replaced by short tubes connected to a wide and high air passage immediately beneath. In the older engine both pumps are operated by means of annular valves, and the gas pump is further provided with a rather complicated arrangement to enable gas to return from the pressure to the suction side

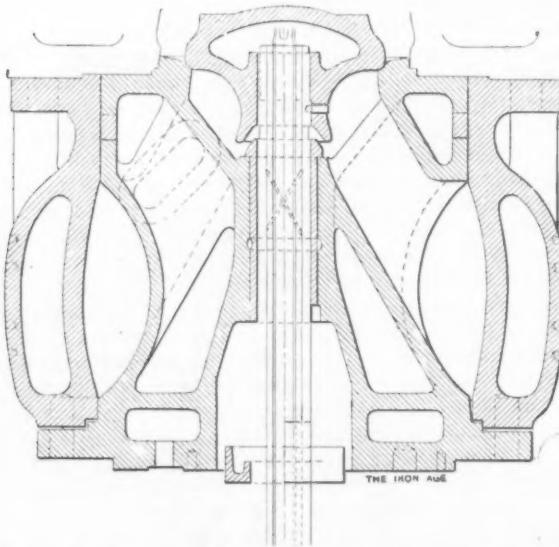


Fig. 4.—Detail of the Exhaust Valve as Modified from the Form Shown in Fig. 3.

when the load is light. The newer machine has an air pump provided with suction and discharge valves which act automatically. The gas pump is positively regulated on the suction side by a Rider slide valve, controlled by a governor, while the discharge valves are automatic. The passages for air and gas under pressure were also made larger. The cylinder and lining have been made separate, and the metal between the exhaust openings in the latter sawed through to allow for expansion. The suction valves of the blowing tub are operated by eccentrics on the main shaft, instead of worm gears on the side shaft. In the older engine the gears caused much trouble by working loose, owing to the constant shocks.

The arrangement in the first engine of inlet valves opened by a cam and closed by a spring having given so much trouble, the corresponding valves of the new engine were made to be both opened and closed by levers, with satisfactory results.

In Differdingen a rod mill and other rolls are driven by a duplex gas engine of the Oechelhaeuser type. The cylinders are arranged side by side, and behind them in the same horizontal plane are the pumps. The latter deliver air from one side of their pistons, gas from the other, and are driven by a rearward extension of their piston rods. Both suction and discharge valves of the pumps are automatic. The speed is controlled by a governor acting on a by-pass, which allows gas to return from the pressure to the suction side. The valve mechanism of the engine itself consists of the well-known two pistons, of which one controls the gas and one the air. The side shaft is used only for operating the igniter and the governor, so that the whole arrangement is the simplest possible. Of all the gas engines in Differdingen this one costs the least for repairs. As the cylinders are open at one end the lubrication can be closely watched,

and less oil is used than is the case with double acting engines.

The German writer thinks that the battle for supremacy in large gas engines is between the double acting four-cycle engines, the Koerting and the Oechelhaeuser types. Further, that victory will not necessarily rest with the engine using the least gas, but with that which offers the greatest security in operation. He is also of the opinion that the gas engine is not suitable for rolling mills, as it needs too many repairs, too much room and too much attention. Blowing engines will be driven direct, and other gas engines will be used for generating electricity, which in turn will drive rolling trains, cranes, &c.

The New England Foundrymen's Association.

The annual meeting of the New England Foundrymen's Association, held at the Exchange Club, Boston, on the evening of January 11 was an occasion that will be long remembered by the members, for it was an evening of many unusually pleasant features. Not the least was the presence of a delegation from the Philadelphia Foundrymen's Association, which entertained several of the New England foundrymen a year ago. These guests were Dr. E. E. Brown of E. E. Brown & Co., Josiah Thompson of Josiah Thompson & Co. and Frank Krug of the Joseph Dixon Crucible Company, Philadelphia; D. G. Moore of Elizabeth, N. J., and E. E. Durant of the G. F. Warner Mfg. Company, New Haven, Conn.

The event of the after dinner speaking was the presentation to the Philadelphia Association of a fine etching of the Old North Church, Boston, which will hang in the Manufacturers' Club, Philadelphia, in the room in which the foundrymen hold their meetings. President John Magee in his presentation speech alluded to the Old North Church as being to Boston what Independence Hall is to Philadelphia, for it was in its tower that the lanterns were hung to notify Paul Revere of the British departure for Concord and Lexington. Dr. Brown accepted the gift with appropriate remarks.

The election of officers came before dinner, the following being the board for 1905: President, John Magee, Magee Furnace Company, Boston; vice-president, Walter B. Snow, B. F. Sturtevant Company, Hyde Park, Mass.; treasurer, George H. Lincoln, George H. Lincoln & Co., Boston; secretary, Fred F. Stockwell, Barbour-Stockwell Company, Cambridge. Executive Committee—the officers and J. O. Henshaw, N. S. Bartlett & Co., Boston; A. J. Miller, Whitehead Bros. Company, Providence, R. I.; Harry E. Gibby, Mechanics' Foundry Company, Boston; W. C. Doherty, Doherty Bros., Lowell, Mass., and Henry A. Carpenter, A. Carpenter & Sons Foundry Company, Providence.

The N. H. Reed Company, Somerville, Mass., and the Hopson & Chapin Mfg. Company, New London, Conn., were elected to membership. The report of Secretary Stockwell showed that the association had made substantial progress in its membership during the year, with a net gain of 21, bringing the total of members up to 115.

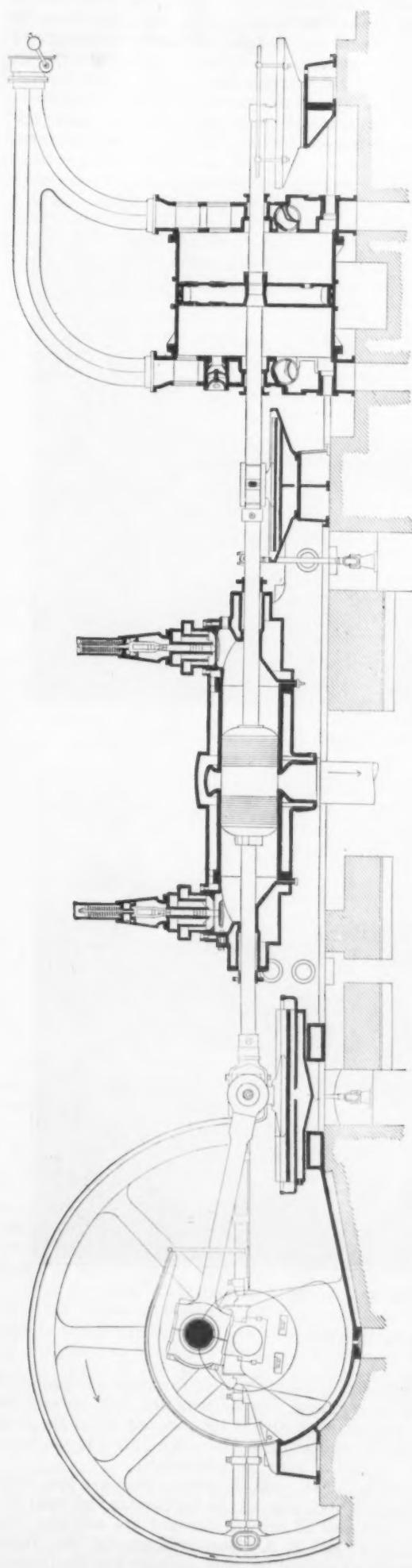
More than 100 members and guests sat down to the excellent dinner, after which Prof. H. C. Metcalf of Tufts College read a very interesting paper, illustrated by lantern slides, on "Welfare Work for the Benefit of Employees," telling of the work that has been done by employers to increase the comfort and general welfare of employees in the shop and in the home, also paying attention to the results which have been accomplished for the good of the employer. There followed speaking by a number of gentlemen, introduced by Toastmaster Henry A. Carpenter, including Dr. Brown, Mr. Thompson, Mr. Moore, Mr. Durant and Mr. Krug of the Philadelphia Association; Vice-President Snow, Henry F. Arnold of the American Tool & Machine Company, who is president of the Boston Metal Trades Association, and President C. F. Baker of the Street Railway Mechanics' Association. The evening closed with a very entertaining vaudeville show by performers from a Boston theater.

John Mitchell has been unanimously re-elected president of the United Mine Workers of America.

January 19, 1905

THE IRON AGE

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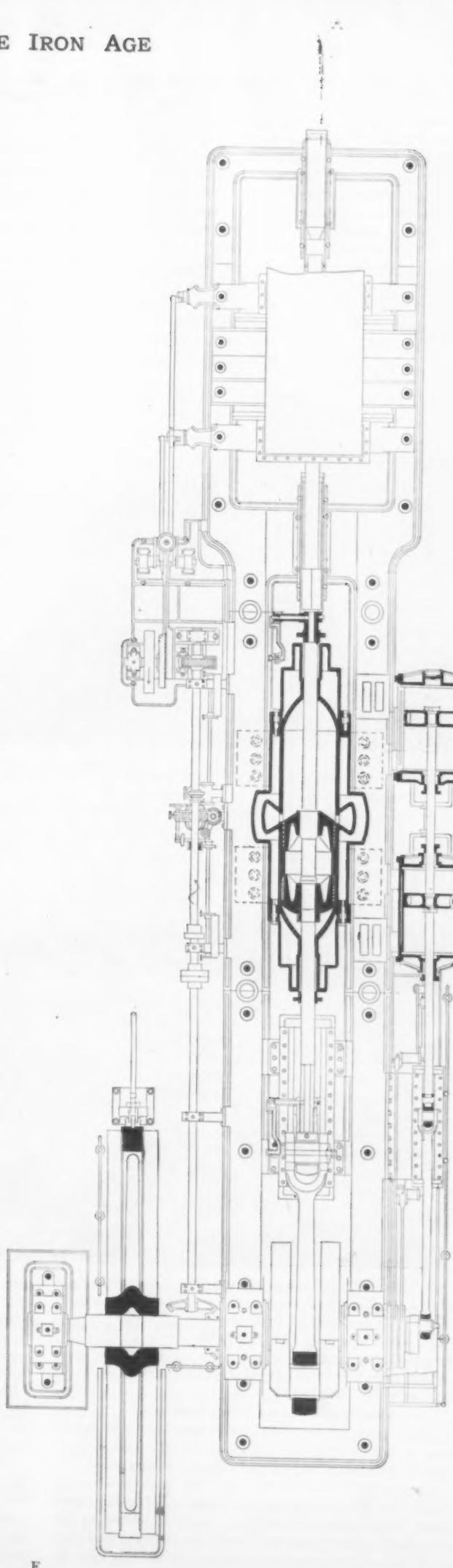


Fig. 5.—A 600 Horse-Power Gas Engine of the Koerting Two-Cycle Type Which is in Use at Neunkirchen.

Duluth Hydro-Electric Development.

BY DWIGHT E. WOODBRIDGE.

What will be second only to Niagara water and electrical power development has now been financed and is to be constructed during 1905. This is the improvement of the water power of the St. Louis River, at the head of Lake Superior, where more than 200,000 horse-power are

The later advances in electrical transmission have changed all this, and the present scheme is hydro-electric. Since Mr. Cooke first bought the water rights along the famed "Dalles of the St. Louis" he has had many opportunities of associating himself with power developments; but until now the psychological moment seemed not to have arrived. The methods proposed were not satisfactory, the men connected with them were not capable, or the times were not propitious. But now there appears a



A Tributary Stream, the Cloquet River, at a Storage Dam Site, Showing Logging Operations.



The St. Louis River Between the Upper Dam and the Power House.

DULUTH HYDRO-ELECTRIC DEVELOPMENT.

available, and where the initial development is to be 30,000 electrical horse-power.

The Project Long Contemplated.

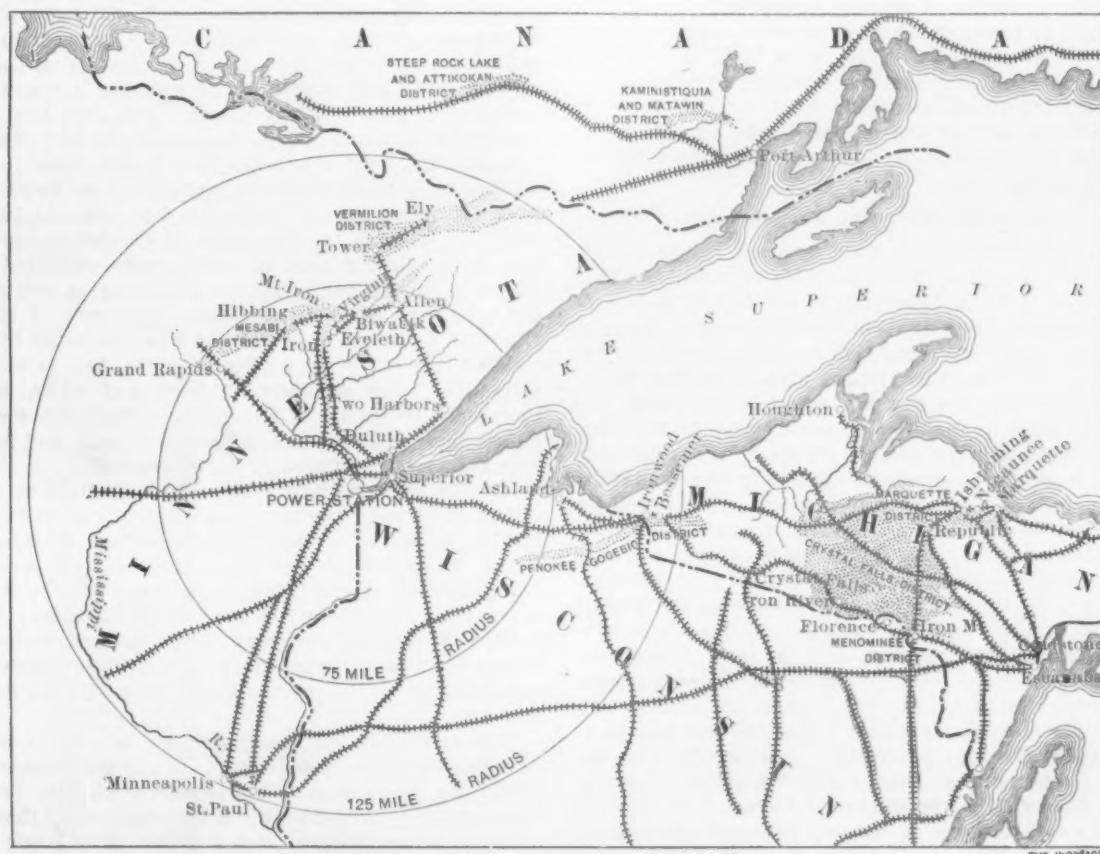
For more than 30 years the development of the power running to waste over the rapids of the St. Louis River at Duluth has been considered; first by Jay Cooke, a famous financier of war times and the banker who carried the load of building the Northern Pacific Railroad, but later by others. All the early projects looked to the improvement of the river itself, and the construction of a series of dams for generating direct hydraulic power.

most remarkable conjunction of favorable circumstances. The plans are more feasible than any ever brought forward, the men associated in the company are of the greatest financial strength and business ability and the opportunity for sale of power is tremendous.

For the past five years the present plan has been under development, until now all the engineering and legal difficulties that can be brought forward are met and overcome. C. C. and F. A. Cokefair originated the project, the former as general business manager and the latter as chief engineer, and an organized office and engineering

force has been steadily at work, with the advice and assistance of many eminent specialists. The proposition is entirely free from all complications of any character and the developments involve no extraordinary engineering feats; all of which simply means that the work of the past five years has been well done and has stood the test of severe examination by experts of bond houses and engineering establishments from the East. The Great Northern Power Company, which is the name of the corporation undertaking this enterprise, is controlled by a number of the most successful and eminent business men of Duluth, holds franchises in that city, and has contracts with franchise owners in Superior. It has closed contracts for nearly the entire initial installation, amounting to 30,000 horse-power, and expects to make arrangements for long distance delivery to mines and the installations

consists of a dam and service reservoir at Thomson, with about $2\frac{1}{2}$ miles of canal from this dam to a pipe line leading a mile to a power house on the river above Fond du Lac. Of the total fall of 395 feet in the six miles of river between these points 378 will be available for the pipe line, and owing to this great fall a foot of water is equivalent to a horse-power. Using two-thirds of the drainage area and 30 per cent. of the total rainfall, there is available 93,000 horse-power of a 42 per cent. load factor; that is, of 10-hour power. For this power it will be necessary to provide a storage of 712 square-mile-feet. From the waste weir of this pipe line to the foot of the rapids there is a fall of about 75 feet. It is proposed to utilize this by the erection of a dam and to develop about 12,500 direct hydraulic power. This will be used for large power consumers, such as pulp and paper mills. There is



Map of Lake Superior Region, Showing Radius of Power Distribution from the Duluth Hydro-Electric Power Development.

tion of electricity on important railway lines that will increase this total several fold.

Three Separate Developments.

The St. Louis River offers the only possibility for any important development of power at the head of Lake Superior, and by systems of short open divergence canals its great flood of water can be readily brought to the heights above the city of Duluth. Measurements of flow during a series of years show an average continual discharge of about 150,000 cubic feet per minute, which is about 36 per cent. of the rainfall over the drainage area. This area covers 3700 square miles of tableland, almost entirely forest and swamp, and very little of it utilized for any purpose. To make the flow available for a continuous power it will be necessary to construct storage reservoirs, and several of these have been arranged for. All of them take advantage of natural conditions and all are easily constructed. The largest will impound a reservoir of over 45 square miles surface area and over 900 square-mile-feet capacity. Reservoirs to utilize 30 per cent. of the mean annual rainfall can be easily secured and at a cost of not more than \$1500 per square-mile-foot of capacity.

Of the three projects included in the plan those called the Thomson and Fond du Lac are to be constructed first. Work on the Thomson development begins this winter. It

vast possibility of development at the head of the lakes along this line, and it is stated by leading pulp mill constructors that at no point in the United States can pulp and paper be made as cheaply as here. Nowhere in the world are there such forests of pulp timber as lie contiguous to Duluth. These two developments will give a horse-power of 107,000, but only about 30,000 will be put into use at once.

The third development is called the Duluth Heights project, and will be more interesting from an engineering standpoint than either of the others. This consists of a number of storage dams on the upper rivers and leads the water away from its natural courses to the top of the high hill above Duluth. Here a large forebay is to be built, and from this forebay steel pipes will conduct the water down hill, the effective fall being 740 feet. This fall is so great that the drainage from but 1,300 square miles is required to give an effective 105,000 horse-power, with 30 per cent. of the annual rainfall and after storage for 397 square-mile feet has been provided. With such a high head at the wheels one cubic foot of water is good for two horse-power.

Work at the Thomson improvement will include a dam flooding 480 acres and with 15 feet draft. This is but an enlargement of a dam now in use. From this dam will be a canal $1\frac{1}{2}$ miles long to the forebay. Much of the

canal will be channeled in slate, the rest earth embankment. Rock sections will be lined with concrete. The dam may be steel, masonry or concrete. The canal will be 32 feet wide at top and will provide for 80,000 horse-power. In general the arrangement of the wheels will be similar to Niagara and the first contracts will call for two or three of 12,500 horse-power, all to be water balanced and with oil thrust bearings. They will be coupled to internal revolving generators of 7500 kw. each. Wheels and generators are of larger size than have ever been placed in service. The current will be 25-cycle, 3-phase, 6600 volts, and will be stepped up to 30,000 volts or multiples thereof, through banks of three transformers of 2400 kw. each for every generator. The power from each generator will be transmitted to a central transforming and distributing station in Duluth on power lines carrying two circuits of 10,000 horse power each.

In order to utilize all the flow regulated by the storage reservoirs on the drainage area service reservoirs will be required near the point where power is to be developed to store the continuous and comparatively regular flow of the river each day to meet intermittent demands of power users without loss of water. There will also be proper forebays of ample capacity to provide for sudden fluctuations of station load.

A Great Field for the Use of Power.

At Duluth and Superior there are now in use engines of a total capacity of more than 50,000 horse-power, in addition to those at industries whose fuel is their own refuse material. There is about the same amount of power consumed along the Mesaba iron ore range, 70 miles from Duluth. The Vermillion range, with a smaller power consumption, and the Gogebic, whose requirements are nearly as large as the Mesaba, are from 90 to 100 miles from Duluth. Minneapolis and St. Paul, whose demands on power are far in excess of what their own waterfalls can supply, are about 125 miles distant. None of these locations is so far from the source of power generation at Duluth as to preclude transmission at low cost and slight losses, and the possibilities at all of them are very large. For the transportation of iron ore from the Mesaba range to Duluth about 100 large locomotives are in constant service about eight months of the year. Plans have been considered and estimates made for the substitution of electricity for steam on all this work, and careful estimates show a saving on the amount of ore now transported annually of a very large sum. It is probable that not only will the bulk of Mesaba and Vermillion mines be served from this power station at Duluth, but that the railroads will later be completely equipped electrically. This latter is the most important installation of electricity for steam on heavy traffic roads that has ever been definitely considered, for these roads now handle more than 15,000,000 tons of ore yearly and the tonnage is steadily growing. Coal is brought 1000 miles to the head of the lake and for the iron ore mines it is hauled by rail into the interior.

The system of charge for power has been carefully worked out. Roughly speaking, it runs about two-thirds of the cost of steam in the most efficient plants at the head of the lakes, though the cost of direct hydraulic power for large consumers will be only \$10 per horse-power per year. The Duluth schedule is somewhat higher than that of Niagara for installations with low load factors, and *vice versa*. It has been adopted with a view to inducing power users to reduce their peaks of load, which should result in increasing the load factor of the power station, and thereby decreasing the cost of station installation and increasing the efficiency of the system. It also insures a proper charge to new customers whose power requirements and service conditions are not known, and to those whose requirements are variable.

The installation cost of the first project will be about \$125 per horse-power and of the later developments so much less that the average will be under \$100. This is so low that the possibility of competition by steam is not considered. Ideas of engineers have combined on the advisability of large units of power and on high head developments, and in both these factors the new project at Duluth is ideal.

The Importers' Automobile Salon.

The present week is a great one for the automobile industry, with two large exhibitions taking place concurrently in the city of New York. One, known as the Importers' Automobile Salon, was opened last Tuesday at the Herald Square Exhibition Hall, at Broadway and Thirty-fourth street, and will continue until January 24. The other, the National Automobile Show, at Madison Square Garden, will receive attention next week.

The Importers' Salon is noteworthy as the first attempt of importers of foreign made cars to display their wares on an independent stage. Accommodations afforded by the Herald Square Hall are admirably adapted for the purpose, and an ample floor space, which is somewhat greater than that on the main floor of Madison Square Garden, gives an excellent opportunity to display the exhibits in an attractive manner and still leave plenty of room for visitors. A point worthy of comment in this exhibition is the attention which has been given to the artistic side. The nature of the exhibits is one which contributes to a brilliant display, and this has been augmented by remarkable endeavors in the way of decorations. The most prominent piece in the decorating is a frieze made up of 24 panels painted by Jean Paleologue which encircles the hall, being 504 feet long and 10 feet deep. It portrays typical scenes of an endless automobile race. Racing cars of every make exhibited are shown in various parts, and the panorama as viewed by the spectators is most impressive. The work of execution was a record, as the whole was completed in one month's time. The color scheme on the floor is equally attractive, being generally of green and white, while the pillars, which are of brown, are wound with smilax. Palms, ferns and flowers and French, German and American flags are freely used in the decorations.

On the opening night guests were admitted by invitation only and speeches were made by Carleton R. Mabley, president of the Salon; Winthrop E. Scarritt, Baron Moncheur, Envoy Extraordinary and Minister Plenipotentiary of the King of Belgium; M. des Portes de la Fosse, Counselor of the French Embassy; Herr Schiller Steinwartz, secretary to the German Embassy; Signor Centaro, military *attaché* of the Italian Embassy, and Assistant Secretary Armstrong of the United States Treasury.

The exhibit of automobiles is one of great interest as indicative of the present status of the art of manufacturing the finest possible machines. Some idea of the value of the exhibits is conveyed in the statement that the cheapest automobile is quoted at \$5000. The larger machines are placed in the center of the hall, while along the sides of the auditorium are shown the various parts and accessories, such as lamps, automobilists' clothing, &c. The following is the list of exhibitors, with the line which each represents:

- Hollander & Tangeman, Flat.
F. B. Gallaher, Georges Richard-Brasier.
- Charron, Girardot & Voigt, C. G. V.
- F. A. La Roche, Darracq.
- S. B. Bowman Auto Company, Clement-Bayard.
- Standard Auto Company, Decauville.
- Central Auto Company, Napier.
- Mors Auto Company, Mors.
- Auto Import Company, Rochet-Schneider.
- J. S. Heller, Pipe.
- Palmer & Christie, Martini.
- Union Motor Supply Company, De Dietrich.
- Norris N. Nason, Leon Bollee.
- A. Ferro, Corre.
- G. W. Condon, La Minerve.
- L. J. Gaugler, Delahaye.
- Albert Stockford, Electromobile.
- American Auto Storage Company, Franklin.
- I. W. England, Peugeot.
- Continental Motor Company, Columbia Electrics.
- Henri Fournier, Hotchkiss.
- Mondale & Dale Company, Berliet.
- Leon Rubay, accessories.
- Quinby & Co., automobile bodies.
- I. S. McGlehan, Odometer.
- F. D. Winans, Michelin tires.
- Continental Caoutchouc Company, Continental tires.
- Minimax Company, fire extinguishers.
- Smith & Mabley, Panhard, Renault, Mercedes.
- International Supply Company, accessories.
- François Richard, carburetors.

Klean-All Mfg. Company, Klean-All.
W. C. Duane & Co., tourist auto tops.
R. H. Macy & Co., motor boats and auto clothing.
Sampson Leather Tire Company, Sampson tires.
A. J. Meyers, Astor motors.
J. S. Heller, tires.
J. P. Colt & Co., acetylene lamps and generators.
Republic Tire Company, Non-Skid tires.
E. B. Gallaher, tires.
L'Empereu, tires.

The Tuttle Reversing Gear.

A great many small power boats are not equipped with reversing gears because of the expense of this auxiliary mechanism, which is often greater than that of the motor itself. In designing the reversing gear shown in the accompanying illustration the H. A. Tuttle Mfg. Company, South Norwalk, Conn., has endeavored to produce a mechanism at moderate cost capable of doing the work. The general external appearance of the gear is shown in Fig. 1 and the line drawing, Fig. 2, shows its construction and the principle of its action.

Referring to Fig. 2, it will be seen that sun and planet gears are used, producing a differential between the speed of the engine shaft and that of the propeller. There are three each of the pinions D and E, which are fitted with hardened bronze bushings and are always in mesh, but are running only when reversing and when the engine is running idle. The gears C are keyed to the engine shaft A, and the gear F to the propeller shaft B, gear F being the greater in diameter of the two. The pinions D mesh

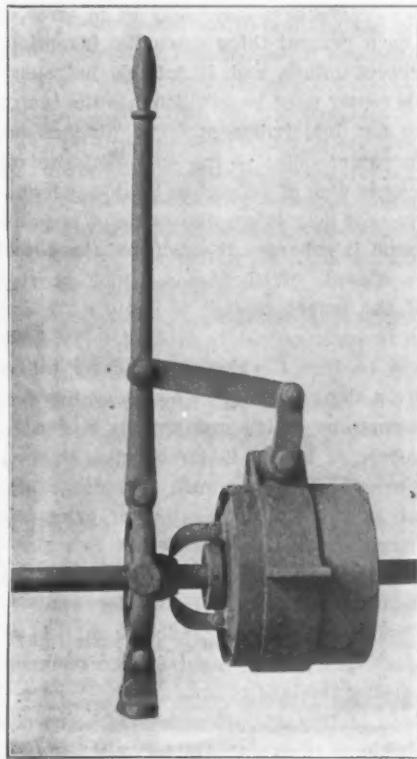


Fig. 1.—The Tuttle Reversing Gear.

with the gears C and the long pinions E with the gear F, transmitting the power from the engine to the propeller shaft but with reverse motion and 25 per cent. slower. This result is obtained, however, only when the gear case is held stationary by the band brake P, which clamps the case rigidly when the operating lever is thrown back in the opposite position from that shown in the drawing. When it is desired to go ahead the frictions G and H come into play. The shank of the propeller shaft gear F is cut square and upon it the bronze friction disks G and H are secured. The intermediate disks G are cast iron and are secured to the gear case. The bronze disk J carrying the clutch fingers L is held in place by the screw collar K. When the lever is thrown forward the fingers ride upon the cone M and the short ends of the

levers bearing on the screw collar force the friction disks tightly together. The same motion of the lever releases the band brake, allowing the gear case to revolve, causing the engine to drive the propeller shaft directly. The pressure upon the friction disks is adjusted by turning the screw collar, which travels on a thread. When the right adjustment is secured the collar is locked by a set screw. When the operating lever is in the central position—that is, about vertical—the band brake and the clutch are both released and the engine runs idle.

In large sizes of the reversing gear there is no differ-

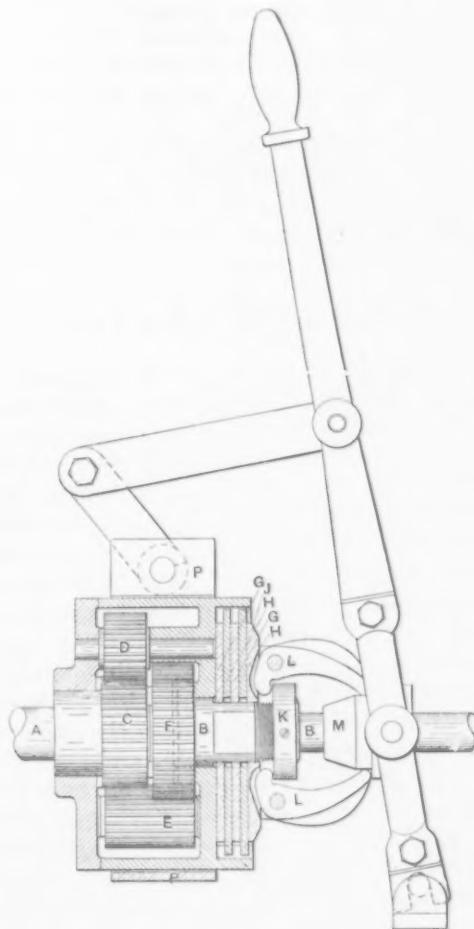


Fig. 2.—Sectional Detail of the Reversing Mechanism.

ential—that is, the backing speed is the same as the forward and the pinions D and E are of the same diameter, as are also the gears C.

Additional Awards Made by the Louisiana Purchase Exposition.—Wright Shovel Company, Anderson, Ind., gold medal; St. Louis Automatic Funnel Company, St. Louis, Mo., bronze medal; American Iron & Steel Mfg. Company, Lebanon, Pa., gold medal.

The Pittsburgh, Cincinnati & St. Louis Railroad, better known as the Panhandle, has placed an order for 4000 steel cars, divided between the Cambria Steel Company, Johnstown, Pa., and the Standard Steel Car Company, Pittsburgh, for delivery in February and March. There will be 1500 all-steel self cleaning hopper cars, 1500 drop bottom cars and 1000 straight gondola cars. The order is the largest ever placed by the Panhandle, is all additional equipment and not renewals of old cars.

The Swett Power Company, Medina, N. Y., placed in operation on the 6th inst. the first of the three 60-inch steel penstocks which it has built at its new power dam, the other two being nearly ready for installation. The capacity of the three units is 2400 horse-power. The power dam is 600 feet in length and 60 feet high.

THE IRON AGE

1855-1905.

New York, Thursday, January 19, 1905.

DAVID WILLIAMS COMPANY,

PUBLISHERS.

CHARLES KIRCHHOFF,

EDITOR.

GEO. W. COPE,

ASSOCIATE EDITOR.

RICHARD R. WILLIAMS,

HARDWARE EDITOR.

Two Grand Prizes.

In the words of the Jury of Awards of the Louisiana Purchase Exposition a Grand Prize has been awarded to *The Iron Age* "for Publication," and a second Grand Prize has been awarded to the David Williams Company "for *The Iron Age* and other Publications." There are two distinct awards, *The Iron Age* sharing and being specially named in the general award to the publications of the David Williams Company.

The New British Patent Law.

The new British patent law, which went into effect with the new year, has its severe critics. Various weaknesses are pointed out, as might be expected of a radically new order of things in the patent office of a great industrial nation. The chief complaint, however, seems to be over the rule that requires the patent office officials to indorse upon the patent a record of whatever flaws may exist, including, of course, prior inventions with which it conflicts. Such a patent is spoken of as being "Indorsed," which is rather misleading in that it suggests the approval of the patent office rather than a criticism. It is pointed out that the general patent law, under which the present rules were framed, provides that there shall be no publication of any report of the examining authorities as to an application for a patent. The rule violates this provision by the "indorsement," which is the gist of the report, where it is unfavorable to the patentee.

Under this law a patent cannot be refused. The office makes careful search of British patents for 50 years back. If there is conflict with previously granted patents the applicant is notified, and may so amend his application as to include an acknowledgment of prior inventions discovered by the examiner. That should be sufficient, it is contended by the critics, without the indorsement of the same facts by the authorities. The reason given is that examiners of patents are by no means infallible and the inventor may be made the victim of erroneous judgment. From the point of view of the American inventor this British rule does not seem unfair. In this country the patent office may refuse to issue a patent where the applicant presents something that does not possess the necessary novelty. In Great Britain a patent must always be granted, but where the application is such that in the United States it would be refused, or granted only in part, the British patent office sets forth upon the patent whatever weaknesses may exist in its claims for novelty. There is no very great difference after all in the final result. As great an injustice may be done under the American system, and even greater, for the inventor whose claims are rejected has not even a record under which he may sue for infringement with a possibility, as exists in Great Britain, that the courts will rule the examiner in error and that the invention should stand without regard to prior patents.

For the sake of comparison between the two systems as they now exist the illustration given in one British

argument is worth while recording. Should a manufacturer lay down a plant and begin to manufacture under an officially "indorsed" patent, his competitors would very likely do the same thing in defiance of the patentee. If the latter should assert his rights and sue for alleged infringement he might recover damages. The competitors would suffer, "but they would have no redress as a consequence of the judgment of the examiner who so erroneously indorsed the patent." There would appear to be no very good cause for sympathy in such an instance. The patentee whose judgment had been so sustained as against that of the examiner would deserve more sympathy in the fact that he has no redress against the examiner. But he has recovered damages from his competitors. He is infinitely better off than the American inventor would be under the same general conditions, for the latter would have no patent upon which to sue. In this country a doubtful invention which is believed to have value is oftentimes not presented to the patent office, but its use is kept as secret as possible. The British inventor has the same option.

It would seem only fair to the investing public that where a patent office had no option but to grant a patent upon every application, no matter how unworthy the alleged invention may be, the patent should be so indorsed as to bring its weaknesses plainly before those who might be tempted to invest their money in a venture based upon it. The examiners may be in error in some cases, but as a general thing a worthy invention is apparent to the examiner, and, if not, his judgment is not final, for his report must be submitted to the central head of the office for final judgment. The "indorsement" of the British patent office is the only real equivalent to the American system of refusal to issue a patent. While such indorsement may injure the value of one patent, on the other hand it enhances the value of the patent from which it is absent. Without some such provision the function of the patent system to protect the public as well as the inventor would be lacking. For instance, a patent might be issued which would deter others from manufacturing along some line, when in reality the patent protected something which was not an invention at all and could never be upheld in the courts. It may be argued in answer to this that such a patent, without the indorsement, would contain mention of prior invention, not as a record of the patent office but as a part of the specifications of the application, amended at the suggestion of the office. This argument also applies as an answer to the claim that an "indorsement" is not fair, for the indorsement is only another and more emphatic way of recording the lack of originality. Where there is a weakness in an invention there should be no complaint that it is brought conspicuously forward. As for erroneous judgments, such danger must always exist under every law, and generally the danger is remote.

Electric Railways Have Their Own Problems.

The report of the Massachusetts Railroad Commissioners contains quite startling statements as to the financial condition of the electric railways of the State. Of 74 operating companies 30 failed to earn expenses and fixed charges, and of the 25 that paid dividends only 14 earned them during the year. Dividends paid decreased \$371,000 as compared to the previous year, and gross liabilities increased by \$2,928,000, while gross assets increased only \$1,980,000. Very few companies besides keeping their railways in good order reserved for depreciation what prudent management would require. Gen-

erally present necessities only have been met, the future, with its inevitable expense for replacement and reconstruction, being allowed to look out for itself. This falling off in earnings is the more perplexing because much of the mileage referred to is within a 50-mile radius of the city of Boston, which territory, it is claimed, contains a greater population than any similar territory in the country excepting New York, but not excepting Chicago and Philadelphia and their suburbs. Yet it is quite what might be expected, and the remedy is quite as apparent, to wait a little while the suburban population continues to grow, as it has been growing of recent years in ever increasing ratio.

History repeats itself. It was much the same during the corresponding period of steam railroad development. Many roads were built that did not pay for years. Some were built that have never paid. Others, the rare exceptions, were abandoned. Population and industrial business did not warrant many of the lines as investments for the time being. But the presence of the railroads developed the country until they made a population which did pay dividends by its patronage. The same is true with electric railways. Where the builders used ordinarily good judgment in selecting the country to be traversed the electric lines are building up a population, generally suburban, that will pay dividends sooner or later. Another parallel between steam and electric railway development is in the great sums of money that had to be expended in re-equipment and rebuilding the roadbed, as means and methods were improved in wonderfully rapid strides during the earlier years of, in the one instance, steam traction, in the other, electric traction. It is probably no exaggeration to assert that, other things being equal, the railroad that kept up its equipment from year to year was more economically managed and was more consistent in paying dividends than those that paid dividends first and let the matter of maintenance and improvement take care of itself.

In Massachusetts, and doubtless the same condition exists elsewhere through the Northern States, the excuse for the falling behind in earnings is the severity of last winter and the coolness of last summer. Doubtless the business depression had something to do with it. The Railroad Commissioners think this is only a part of the story. They assert:

The evil is more radical. In the early days of the change from horse to electric railway promotion ran wild with the idea that immense profits were to be realized in the extension of the old and in the construction of new railways as electric roads in any and every direction; that where no business was in sight it would appear under the creative magic of the electric car. The test of this opinion, necessarily a test of years in which novelty disappears, is now practically complete. Experience has shown that with the more expensive roadbed and equipment, the heavier rail and larger cars, there has not been the corresponding and expected development of permanent business. Operating cost, too, in heating cars and in repair and renewal of plant has proved larger than was expected. With the new accommodation and the nearer approach to railroad conditions has come the increased demand of the public for expenditures in the interest of safety and comfort which had not been counted upon, as, for example, in construction of double track, installation of signal systems and establishment of waiting rooms. In such cases the future promises as possible events the acceptance of an unsatisfactory service as better than nothing, an increase in fares or the abandonment of the railway.

The alternative of increased fares or abandonment of the property may hit the case of electric railways situated in isolated regions, where they never should have been built. But it is poor advice to suggest letting equipment fall behind. If a railway is worth operating it should be maintained at a reasonably high standard as far as maintenance of equipment and roadbed is concerned. Progressive street railway managers believe that more money is earned, net, where the equipment is good than where it is in poor shape, no matter where the line

is located. In Massachusetts the laws and the powers given to the Railroad Commission are responsible for much of the falling off in net earnings. They are excellent laws, because they tend to increase the safety and comfort of both passengers and employees. Vestibules and air brakes, the entire avoidance of grade crossings, serviceable signal systems and other compulsory provisions rigidly enforced, cost a great deal of money. But much of this comes under the initial investment. The money has been paid. Maintenance of equipment is all essential in these companies that have fallen off in earnings, and they control the greater part of the total mileage, for they are competitors, each trying to build up its country with suburban homes and industries, each seeking the patronage that will earn dividends later on. The company that fails to realize this, or, realizing it, prefers to pay dividends to-day rather than to make necessary improvements and provide for sufficient maintenance, will in the next decade find its stock worth less money than that of its more businesslike competitor.

Probable Industrial Building Activity in New England.

There are strong indications that there will be an unusual amount of new industrial building in New England this year, including the carrying out of plans by manufacturers in the metal lines. The time is not quite at hand for announcements to this effect, but it is known that many additions are being considered, and architects are already at work and builders are being consulted as to probable costs. The recent depression came at a time when not a few manufacturers had plans made and preparations practically completed to build. The lull in business that preceded the radical falling off of demand was taken as a warning that it would be better to wait a while before investing more money in plant, and plans were locked up to be ready for the time when they would be needed. That time has come. No one anywhere in the metal manufacturing lines—in fact, in any line—appears to have the slightest doubt that the period of prosperity now beginning will be a long one, and consequently every one who needs more room in order to bring manufacturing facilities up to what is considered to be the probable demand is considering the question. Well founded reports of large establishments which will be very materially increased, even doubled, are not infrequently heard. In most instances the interested parties pronounce the reports as premature, and there are obvious reasons why it is not well to speak of such plans earlier than is necessary. The machinery builders and other manufacturers whose products enter into shop and factory equipment should be very material gainers by this activity.

Visionary Schemes to Attract Investors.

Profiting neither by the experiences of others nor the warnings circulated almost daily throughout the country, men continue to let themselves be inveigled into investing their money in visionary schemes, the promoters of which paint glowing pictures of sure returns bordering on the fabulous. It seems that there are many who only need to be shown the mere outline ere they immediately see a chance to become wealthy, and diving down into their pockets, hand over their money to put the scheme in operation. Projects are continually being brought forward which are to put this, that and the other thing out of business, but only with the result of the loss of money invested by the gullible ones. While

very often the well meaning of many of the inventors who are led astray by their enthusiasm cannot be questioned, there are others whose object is to catch men napping, knowing full well that every penny they take is procured by fraud.

A striking example of one of these schemes was recently brought to light when a receiver was appointed at Chicago for the Whitney Electrical Company, which was capitalized at \$56,000,000 and whose assets, according to the petitioners, consist principally of "mythical plans and absurd inventions." One of the inventions, it is alleged, consists in "ejecting or shooting above and beyond the atmosphere of the earth four brass balls, which are supposed to gently and peaceably remain beyond the atmosphere after having once been thrown or shot there!" The advantages to be obtained in penetrating the ethereal regions are not stated. It should be remembered that, with but few exceptions, large enterprises are the result of a gradual growth and fortunes are the product of long labor. When one is brought face to face with a proposition promising enormous returns the very suggestion that "there's millions in it" ought to be a warning to go slow and investigate thoroughly before investing. There have been few instances where the investor has lost by being too conservative.

Cheap Automobile Production.

It is announced in Birmingham, England, that a German manufacturer is to put on the English market this season a four-cylinder motor car, capable of holding four persons, for about \$485, and for \$73 less when designed for two persons. It will be a light machine, with only 9 horse-power in its motor. There are single cylinder automobiles abroad for \$486 (£100), but they have not the reliability of the four-cylinder type. If the Birmingham report is correct—it is not substantiated by name of the manufacturer or other details—the new machine should mark an epoch in the automobile market. No one has doubted that within a few years a reliable machine will be manufactured and sold for even less money than this. The trend to-day is for the very heavy, powerful car, which requires a large outlay of money for maintenance in addition to the great initial cost. There is, however, another demand to be considered—from people of average means, who will buy as soon as the price comes within the range of their means. The American manufacturers should excel in this class of machine, just as they are now excelling in the more powerful and expensive types. The American system of manufacture is peculiarly adapted to the production of machines in large lots, with duplicate parts, using a comprehensive system of jigs, with everything standardized, which latter processes are well begun by the manufacturers of the heavier machines. Everything considered, the automobile is becoming more simple mechanically. Another great advantage will come to the manufacturer of cheap machines who will produce nearly everything himself, which is not the usual method of automobile building of to-day. He will get all the profits and will consequently be able to do better by his customer.

The Smooth On Mfg. Company, Jersey City, N. J., has gotten up an interesting little souvenir in the form of a pocket case containing a small horseshoe magnet and a piece of Smooth On iron cement packing. The packing is easily attracted by the magnet, showing the high percentage of Smooth On compound in the packing. One of these souvenirs will be sent free to any engineer upon receipt of 5 cents to cover postage.

Proposals for Armor Plate.

WASHINGTON, D. C., January 17, 1905.—The Navy Department on the 12th inst. opened bids for 7828 tons of armor plate for the battle ship New Hampshire and the two armored cruisers Montana and North Carolina, the construction of which was authorized by the last naval appropriation act. Proposals were submitted by the Midvale Steel Company, the Carnegie Steel Company and the Bethlehem Steel Company. Each company presented a bid for the entire amount of armor needed, the proposals of the Midvale Company being the lowest by more than \$100,000, while those of the Carnegie and Bethlehem companies were identical, except that the Carnegie Company did not submit a bid for the 94 tons of bolts and nuts called for by the specifications. The bid of the Midvale Steel Company in detail was as follows:

For one battle ship:	
Class A, 3,048 tons at \$398	\$1,213,104
Class B, 200 tons at \$393	78,600
Class C, 236 tons at \$388	99,328
Bolts and nuts, 38 tons at \$385	14,630

Aggregate. \$1,405,662

For each armored cruiser:	
Class A, 314 tons at \$398	\$124,972
Class B, 1,757 tons at \$393	690,501
Class C, 91 tons at \$388	35,308
Bolts and nuts, 28 tons at \$385	10,780

Aggregate. \$861,561

Total for all armor:	
Class A, 3,676 tons	\$1,463,048
Class B, 3,714 tons	1,459,602
Class C, 438 tons	169,944
Bolts and nuts, 94 tons	36,190

Aggregate for all armor. \$3,128,784

The Midvale Company proposes to begin the deliveries on or about August 15, and to continue at the rate of 500 tons per month.

The bid of the Carnegie Steel Company was as follows:

For one battle ship:	
Class A, 3,048 tons at \$420	\$1,280,160
Class B, 200 tons at \$400	80,000
Class C, 256 tons at \$400	102,400

Aggregate. \$1,462,560

For each armored cruiser:	
Class A, 314 tons at \$420	\$131,880
Class B, 1,757 tons at \$400	702,800
Class C, 91 tons at \$400	36,400

Aggregate. \$871,080

Total for all armor:	
Class A, 3,676 tons at \$420	\$1,543,920
Class B, 3,714 tons at \$400	1,485,600
Class C, 438 tons at \$400	175,200

Aggregate. \$3,204,720

The Carnegie Company agrees to begin deliveries within six months from the receipt of preliminary plans and to continue at the rate of 600 tons per month. The Bethlehem Steel Company's bid was an exact duplicate of that of the Carnegie Company, except that a proposal was submitted for 94 tons of bolts and nuts at \$400 per ton, making an aggregate of \$37,600.

Comparison of Bids.

It will be noted that the total bid of the Midvale Steel Company was \$113,536 less than that of its two competitors. On Class A the difference is \$22 per ton, on Class B \$7, on Class C \$12 and on bolts and nuts \$15. On the score of price, therefore, the Department would be disposed to award the entire contract to the Midvale Steel Company, but there are other considerations which may result in a division between the three competitors. Under the terms of the advertisement the Secretary of the Navy may hold the bids under advisement for 30 days pending an investigation of the ability of the bidders to fulfill the conditions of their proposals. Of course, the chief interest in this matter centers in the fact that the Midvale Steel Company a year ago was awarded its first contract to make armor, all previous contracts having gone to the Carnegie or Bethlehem company. Immediate preparations were made at Midvale for the production of this armor, and it can be stated on the highest authority that they have progressed to the satisfaction of the ordnance experts of the Navy Department.

Up to the present time, however, no armor plate has been delivered, nor have any tests been made of plate representing groups intended for delivery, notwithstanding numerous erroneous reports to that effect. It is a fact, however, that two plates of moderate thickness were recently submitted to the Government as experimental plates for ballistic test and, according to the officials of the Ordnance Bureau, these plates met all standard requirements in every particular. The bureau has decided, however, not to make public the details of these tests, as the plates do not represent armor to be accepted by the Government, and because the tests were made at the request of the contractors and in their interest. The ordnance officers are confident, however, that the Midvale Company has succeeded in solving the problem of making plates at least up to 7 or 8 inches in thickness. It is also an interesting fact that, while the contract of the Midvale Company does not call for any deliveries prior to July 1 next, the Department has been officially advised that a number of plates will be ready before that date.

In awarding the contracts on the basis of the proposals just opened the Department will, of course, take into account the question of deliveries with reference to the completion of the vessels for which the armor is required. Owing to improved methods, but more particularly to the scarcity of other work in the leading shipyards of the country, battle ships and cruisers are now being constructed at a rate of speed that would not have been thought possible a few years ago, and all subcontractors are being taxed to keep up with this progress. It may, therefore, be a matter of some importance to secure deliveries in larger quantity than any one of the three armor making concerns can produce, and this contract may be divided. The information thus far obtained about the Midvale Steel Company's success in producing plates relates to those of less than maximum thickness, and this consideration may have a bearing upon the division of the contract if it is decided not to award it all to a single company.

W. L. C.

The New York Times Building.

An abundance of interesting information concerning the new Times Building at Forty-second street and Broadway, New York City, was given in a supplement to the *New York Times* Sunday, January 1, 1905. This building is the second tallest in New York City, measuring from the curb level. The height from the curb to the base of the flagstaff is 362 feet 8½ inches and distance from the lowest cellar floor to the ground is 57 feet. It contains a remarkable tonnage of structural steel for its ground area, and the percentage of steel to cubical contents is said to be greater than that of any other office building. The weights of some of the materials entering into the construction of the building are given in the following table:

	Pounds.
Structural iron.....	7,424,000
Brick	19,430,000
Cement and mixed mortar.....	14,662,000
Plastering	2,214,000
Ornamental iron.....	500,000
Terra cotta.....	3,662,000
Wood	1,472,000
Sand	2,364,000
Marble	630,000
Terra cotta arches, partitions, &c.....	5,024,000
Electrical conduit, &c.....	622,000
Heating and plumbing.....	700,000
Vault lights.....	84,000
Sidewalks, fill, &c.....	146,000
Cinders	616,000
Air sweeping system, risers and outlets, mail chute and box, pneumatic tubes.....	28,000
Hardware, sash weights, &c.....	69,000
Limestone	2,700,000
Granite (ashlar only).....	390,000
Roofing, tile and skylights.....	94,000
Glass	56,000
Elevator guides, sheaves and cars.....	68,000
Kalamazoo iron frames and sash.....	80,000
Rubble masonry in back fill, exclusive of 2,360,000 pounds of cement.....	14,888,000
Contents, including machinery, water in tanks, furniture, &c. (estimated).....	5,000,000
Total.....	82,923,000

A noteworthy feature in the structural work is the use of what is said to be the heaviest girder for its span that was ever used in an office building. This is the lowest girder across the short north end of the building and carries the weight of the north wall. It is 5 feet high and about 3 feet wide, weighs 30 tons and is composed of three built up I-beams. The load which it sustains is estimated to be 3,097,000 pounds. The structural steel used in the building is calculated to be about 46 pounds per square foot of floor area, or about 1 ton per 600 cubic feet of contents.

Difficulty entered into the construction of the steel work below the ground due to the passing of the Rapid Transit Subway under one corner of the building. This of course had the right of way, and it was necessary for the columns supporting that part of the building which is above the tunnel to be placed as determined by the Subway structure and not where the architects might have preferred them. In two or three cases the columns were placed outside the wall line of the building. Above the Subway girders were placed to connect these columns with columns within the building, and upon the latter were placed the proper columns within the wall line continuing above the street level.

In spite of the apparent complication between the Subway and the building they are absolutely independent of one another. There is no contact between the structural members of the one and the other. Not a piece of iron or particle of concrete that enters into the construction of the Subway touches the building, and vice versa. An air space of about 2 inches surrounds each column of the building where it passes through the Subway floor, and the same space surrounds the Subway columns where they pass through the building. The pressrooms in which the newspaper is printed are below the Subway. The supports of the Subway are carried down through the pressrooms to their own foundation, so that the Subway does not rest on the girders forming the roof of the pressrooms. These precautions were primarily for the purpose of preventing vibration or jar from the trains in the Subway being communicated to the building. To still further deaden the vibration which might be communicated from the Subway if its columns rested on rock foundation with the columns of the building there is a sand cushion about 12 inches deep intervening between the base of the Subway columns and the bedrock. So successful have been the attempts to isolate the two structures that it is found that surface cars in the street and the walking of persons close by have more effect upon delicate apparatus for detecting vibration placed in the building than do the trains in the Subway.

The smoke outlet from the two boilers in the cellar is a steel stack 390 feet high, running through a brick lined vent shaft from the cellar to the top of the tower. The stack is rectangular in cross section, being 3½ x 5 feet. It is constructed of steel plate ¼-inch thick, and the heat of the smoke rising through it creates a draft through the surrounding air, which is utilized in keeping up a circulation in the vent shaft.

The ornamental iron work used in both the exterior and interior of the building adds much to its attractiveness. On the outside are the decorative framings, mullions, windows and doors on the ground floor, the window framings above the twelfth story and all of the railings protecting the sidewalk entrance to the basement, and inside are the stairway railings and elevator inclosures, both of which are distinctive because of their beautiful grille work. All of the show windows downstairs are set in iron, and the decorative cornices in each case are most artistic. On the exterior of the upper floors of the building, where the windows form an especially large portion of the wall surface, the ornamental iron framings and decorative mullions form an attractive feature of the architecture. The iron work on the ground floor and the railings outside of the building are electro-bronze.

Electricity is used for numerous and various purposes in the building, involving wiring systems comprising some 74 miles of wire and 21 miles of conduit. There are 109 electric motors, with a combined capacity of 1175

horse-power; 2441 outlets for lights, 257 outlets for telephones and 246 outlets for other purposes. There are 6205 incandescent lamps used, 15 arc lamps, 26 mercury vapor lamps and various other means of light, such as vacuum, glover and search lamps and lights used in signs and bulletin service. An electric fan in the basement, connected with each room by pipes, is used for drawing all dirt or dust from floors or walls. Instead of sweeping, the cleaners use special devices operated with hose for drawing dirt into the pipes and taking it to the basement.

Notes from Great Britain.

The Year's Trade in Great Britain.

LONDON, January 7, 1905.—So far as it is possible to generalize, the iron and steel trades in the Midlands of England have experienced a most disheartening time throughout most of the year; the northwestern trade has been very nearly up to expectation and the northeastern trade better than was expected. In the Midlands the gradual shrinkage which followed the boom of 1900 developed into a complete collapse, both in prices and output, and there were more failures last year in the Midlands than in any year since 1899.

Although the Midland trades have been harder hit than the other sections, yet the same influences have been at work all over the country. There have been two sources of weakness—dull home trade and foreign competition. With respect to the former it is only natural that the monetary conditions, which were so acute in the earlier part of the year, and led to an inclination to conserve cash rather than to employ it in industrial undertakings, should affect the iron and steel trades considerably. Orders have been restricted to the narrowest possible amount, and the giving out of these has been preceded by very close bargaining concerning price. Probably, however, the most serious effect has been produced by foreign competition.

It will be remembered that at the beginning of the final quarter of 1903 there were very large sales of German steel in the Birmingham district, which were the beginning of a spell of the most severe competition experienced for a very long time. The United States took a hand in the competition then let loose, and British steel-makers were left very much out in the cold so far as billets and sheet bars were concerned. That this is the department in which competition was most severe is shown by the fact that the eleven months' imports of this material amounted to 491,122 gross tons, as compared with 224,144 tons in 1903, an increase of 266,978 tons, or over 119 per cent. The modern characteristics of the Staffordshire industry are such that the influences of such conditions in one branch of the trade are felt keenly in the others. Steel is now much more largely used than ever before in the manufacture of rolled products, which a few years ago were chiefly made of iron, and it is not surprising that other branches of trade should be correspondingly depressed; weakness in one direction is bound to spread to others.

The history of the competition is very interesting. Beginning in the fall of 1903, it was resumed in January of last year, and large contracts were secured by Germany. America did not do very much, owing to the fact that there was too great a desire to pick and choose contracts and to impose conditions as to specification. Germany, however, booked contracts representing an enormous weight of steel at very low prices. This state of things continued until February, and then came a complete change in the position. Apparently all this selling had been done in anticipation of the formation of the German-Belgian steel syndicate, the desire being to secure as many contracts as possible before the syndicate could impose any conditions which might interfere with export business—a state of things which frequently marks the preliminary stages of negotiations for trade combinations.

The news that the syndicate had been formed came on February 11 and was accompanied by notifications of advances in prices. This, however, made very little difference to British trade; the mischief had been done. So much German steel had been bought by consumers that

they were indifferent to the alteration, especially as Germany began to "flood" them with steel. The consumptive demand was not at all large at this time, and as a consequence some firms found themselves badly overbought and with stocks accumulating. The failure of one Staffordshire firm revealed the fact that there was a large stock of German steel lying in the firm's yard, and this is believed not to have been an isolated instance of the kind. From February onward German competition remained a negligible factor so far as fresh sales were concerned. As a matter of fact, any needs which did arise outside those covered in contracts were supplied by British makers, but generally speaking there was little need to buy, and the market remained completely dominated by Germany until toward the end of July.

Apparently contracts began to fall in at this period. At any rate there was a growing inquiry for raw materials, and the position became full of interest. A British firm that had not usually shown much interest in the trade in raw steel changed its policy and came on the market with sheet bars and billets at a reduction of 2s. 6d. as compared with the rate at which the British makers had been accepting fill up lots, with the result that others followed suit and the quotations for home made material were rather easier than those for German. This change came at the crucial moment. Gradually Welsh and North of England makers began to gather in contracts, and as time wore on their position gained in strength. Probably as much to their surprise as to that of outside observers, Germany made no counter move, and throughout August and September they went along quietly but steadily.

The greatest change came in October and November. Consumers then began to make arrangements for the new year. Gradually it became apparent that Germany did not intend to pursue last year's tactics, and as soon as consumers became assured of this and confident that there would be no unpleasant surprises they began to buy British steel for 1905 delivery. In the last quarter of the year, as a consequence, business was brisk with home manufacturers of steel billets and sheet bars, whose position is assured for at least the first quarter of the coming year; if the recent tendency is continued when business is fully resumed after the holidays they will be safe for the first half. The effect of this alteration is seen in the fact that prices finished the year on the up grade, and instead of the £4 2s. 6d. for Bessemer qualities, which has been touched, the asked price is now £4 7s. 6d. upwards. It is of course unsafe to prophesy, but this much is certain, British manufacturers will start out with much better filled order books and free from the stress which caused them so much anxiety at this time last year.

The Shipbuilding Industry.

When the year began shipbuilding was passing through a period of exceptional depression. It had lasted for over two years and was the result, largely, of the South African War, the close of which threw on the freight market a great number of vessels which during the war had been chartered by the Government. On the whole, shipbuilding improved as the year went on. The Clyde district was the last to feel the depression of previous years, and it was also the last to feel the upward movement. By and by orders began to come in, and the conditions were in most cases different from those of northeast coast contracts, as there was not so much of the deferred payment system, under which very long terms were accepted by some of the builders for the payment of ships. It has always been the practice for firms to accept bills for instalments payable a year or so after completion of a vessel, but in some cases on the northeast coast payments were spread over seven and even ten years. A certain amount of this mortgaging of the future was engaged in between Clyde builders and owners, but not to a serious extent. The banks in the Clyde district are not nearly so accommodating as those on the northeast coast, and their safe attitude acts as a strong deterrent on the tendency to speculate in shipbuilding.

The Advent of the Turbine.

A specially notable feature of the 1904 ship production was the building of turbine steamers. The placing of

the contracts for the two turbine Cunarders at Clydebank and Wallsend is certain to make 1904 a memorable year in the annals of shipbuilding. Shipowners and shipbuilders are now coming to have great faith in the new motor, as a note of the turbine steamers launched for mercantile purposes will show:—

Vessel—Built at—For—	B. T. tons.
Princess Maud, Dumbarton, Irish Channel.....	1,746
Turbina, Newcastle, Canadian Lakes.....	1,065
Londonderry, Dumbarton, Irish Channel.....	2,186
Manxman, Barrow, Irish Channel.....	2,174
Loongana, Dumbarton, New Zealand.....	2,448
Lhassa, Dumbarton, B. I. Company.....	2,171
Linga, Dumbarton, B. I. Company.....	2,171
Lunka, Dumbarton, B. I. Company.....	2,171
Lama, Dumbarton, B. I. Company.....	2,171
Albion (s. y.), Wallsend, Sir Geo. Newnes.....	844
Narcissus (s. y.), Govan, E. M. Mundy.....	650
Victorian, Belfast, Allan Line.....	11,400
Virginian, Govan, Allan Line.....	11,200

More detailed comments upon the year's trade must be deferred.

S. G. H.

NEWS OF THE WORKS.

Iron and Steel.

The Page Woven Wire Fence Company, Monessen, Pa., manufacturer of rods, wire and fencing, has prepared plans for extensive additions to its plant, which include the erection of one large four-story building, of steel and brick, and one smaller building, for the manufacture of finished product. The business for the past year was much larger than any preceding year, and constantly increasing trade necessitates larger capacity to fill orders. The buildings are expected to be completed in about four months and the increase in capacity they will afford will give employment to about 100 more skilled workmen.

The Driggs-Seabury Ordnance Company, now building a large plant at Sharon, Pa., for the manufacture of projectiles, intends making a 100-foot addition to its shell shop building, which will make the total size of this building 60 x 260 feet.

The Dover Furnace Company has been organized with a capital stock of \$12,000, by Graham Macfarlane of Clarksville, Tenn. The company has leased the iron rights of the Cumberland River Estates in Stewart County, and will operate Dover Furnace, at Carlisle, producing strictly cold blast charcoal iron for chilled rolls. The company succeeds the Dover Iron Company, which has operated the property since 1901 and whose lease expired January 1. Mr. Macfarlane is president and general manager.

Victoria Furnace of the Chapman Iron, Coal and Coke Company, Goshen, Va., was blown in the middle of December.

The Harrisburg Rolling Mill Company, Harrisburg, Pa., is making improvements to its finishing mill and will start the mill this week. The company's puddle mill has been in steady operation.

The Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa., is installing some new machinery in its rolling mill, which will increase the output considerably and which it hopes to have in operation about April 1.

At the annual meeting of the Champion Iron Company, held recently at Kenton, Ohio, G. F. Carter was re-elected president and treasurer; W. J. Armstrong, vice-president; L. D. Carter, secretary, and T. G. Taylor, superintendent.

The spiegelisen furnace of the New Jersey Zinc Company at South Bethlehem, Pa., was blown in January 10.

The La Belle Iron Works, Steubenville, Ohio, has contracted with the United Engineering & Foundry Company, McIntosh, Hemphill & Co., and the Riter & Conley Mfg. Company for the erection of its new mill. The buildings will be 500 x 100 feet, and the mill will be an 84-inch three-high plate mill, with a complete equipment of tables and shears and driven by a 44 x 60 inch Corliss engine. The company expects to have the mill completed and in operation by July 1.

The plant of the Logan Iron & Steel Company, at Burnham, Pa., is being remodeled under the supervision of John Fraser, contracting engineer, of Pittsburgh. The puddle mill and finishing mills have been remodeled and rebuilt and electrically driven shears and other new machinery have been installed. When all the alterations are completed the company will have a modern plant with a daily output of about 140 tons of bar iron, angles, special shapes, &c.

After six months of idleness the Michigan Iron Company's furnace at Newberry, Mich., resumed operations January 15. During the shut down the furnace was thoroughly overhauled and a number of improvements made. A new Weimer blowing engine has been installed, which will be operated in conjunction with the old engine. The stack was relined and a 20-foot addition built onto the casting house. Installation has also been

made of an automatic arrangement for transferring the coal buggies from the kilns to the furnace. Cement floors have been laid in the engine room and top house.

Circulars have been sent to the stockholders of the Atlanta Tin Plate Company, Atlanta, Ind., by the officers announcing the progress made in getting the plant into shape for running, and assuring them that it will be ready to start in a few weeks. Money necessary to do this and to provide a working capital was obtained by a bond issue of \$80,000.

General Machinery.

The Crucible Steel Forging Company, Cleveland, recently incorporated, has acquired the buildings on East Prospect street formerly occupied by the Meriam-Abbott Company, and it is installing steam hammers and other equipment for the production of steel forgings. It will make a specialty of automobile work.

The Torris Wold Company, Chicago, has incorporated to manufacture can making machinery, with the following named as incorporators: H. H. Lyche, A. W. McGevney and Johan Waage. Officers of the company are: President, Torris Wold; secretary and treasurer, H. H. Lyche. Offices and shop are located at 66-70 North Jefferson street.

It is reported that extensive improvements are to be made at the repair shops of the Baltimore & Ohio Southwestern Railroad at Chillicothe, Ohio.

The E. J. Codd Company, Baltimore, Md., is in the market for a second-hand lathe, either 48 or 54 inch swing and about 4 or 6 feet between centers.

The Sioux City Foundry & Mfg. Company, builder of the Norfolk warm air furnace, Sioux City, Iowa, will immediately enlarge its plant and will make improvements in the way of a large traveling crane with 150 feet run, lathes and chipping tools, and other devices to be found in up to date foundries. These improvements are being made in anticipation of the large building operations which will arise as a result of the recent \$2,000,000 fire which visited Sioux City.

John Dicken has been appointed receiver of the Lawton Foundry & Machine Works, Wabash, Ind., on the application of creditors. The concern was one of the oldest and best established in the State, but became involved during the long illness and after the death of Charles Lawton. The prospects are that it will be reorganized and the business continued.

Power Plant Equipment.

The Bradfield Engineering Company, Grand Rapids, Mich., is furnishing for the new power plant of the Wolverine Brass Works, also at Grand Rapids, the following equipment: A 66 inch by 16 foot horizontal tubular boiler; 12 x 36 inch Columbian Corliss engine built by the Lane & Bodley Company, Cincinnati, Ohio; Hoppe's heater and McGowan duplex boiler feed pump, 5 1/4 x 3 1/2 x 5 inches. The factory is to be driven by a rope drive furnished by the Dodge Mfg. Company, Mishawaka, Ind.

The Walker & Ehrman Mfg. Company, screw manufacturer, Chicago, is erecting a new factory at Fillmore street, just west of Homan avenue. This building will be four stories in height, 124 x 225 feet. A large one-story power house is also to be built, as well as installation made of an annealing furnace. With the exception of an 18 x 42 high duty Corliss engine and two 150 horse-power boilers, which will be utilized for power, no machinery will be needed, as equipment will be removed from the present factory at 127-133 West Washington street. It is expected to have the plant ready for occupancy May 1.

The Board of Public Service of Canton, Ohio, has closed several contracts for equipment for an addition to its water works plant. The William Tod Company, Youngstown, Ohio, received a contract for a Reynolds vertical triple expansion pumping engine, self contained type, with a capacity of 12,000,000 gallons in 24 hours, the price being \$44,600. The engine is to be completed within nine months. Wickes Brothers of Saginaw, Mich., received a contract for three vertical boilers, their bid being \$7473 less \$360 for the reason that stokers are to be put in. The Westinghouse Machine Company, Pittsburgh, received a contract for three stokers on a bid of \$2650. The Michigan Brass & Iron Works Company, Detroit, will supply two 20-inch, two 30-inch and other valves, on a bid of \$1580.

The Canton-Akron Railway Company of Canton, Ohio, is planning to increase the power facilities at its main power station at Canton and is preparing to install a steam turbo-generator of 2700 horse-power, which will give it ample reserve. Additional boilers and auxiliary equipment will also be installed.

Dravo, Doyle & Co., merchant engineers, Pittsburgh, Pa., report a very satisfactory business for 1904. They sold in the year Cochrane heaters aggregating 102,000 horse-power. In 70 units also 171 Cochrane steam and oil separators, which purify 164,800 horse-power of live and exhaust steam, not including the Cochrane separators, which form a part of and are included with all Cochrane heaters.

The Fairbanks-Grant Mfg. Company, Ithaca, N. Y., builder of marine and stationary two and four cycle gasoline motors from 1 to 50 horse-power and boats of all types from 14 to 75 feet, was recently incorporated with a capital stock of \$35,000. The

company has just moved into its new shops, which are equipped with the latest labor saving tools. Enough orders are in hand to keep the works running full until early summer.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until January 24 for an electric lighting system for the barracks at the United States Naval Training Station, Newport, R. I.

The Fowlds Company, Limited, lumber merchant, Hastings, Ont., will add a 75-kw. alternating current generator for furnishing power.

The Town Board of Cayuga, Ind., is considering the installation of an electric light plant.

The Electric Light and Water Department of Marcellus, Mich., will install a new engine and other apparatus for its municipal plant.

Foundries.

The Balke Architectural Iron Company, Louisville, Ky., has incorporated with \$25,000 capital stock. William P. Balke is president; Henry Balke, vice-president, and Frank Schmidt, secretary and treasurer. Greatly increased business during the past year has necessitated the erection of larger quarters, which will comprise a foundry and factory building on Clay street, near Main, one of the buildings to have 142 feet frontage and the other 175 feet. About \$10,000 worth of machinery has been purchased already for installation in this new plant.

The Union Foundry & Machine Company's property at Catawissa, Pa., has been sold by C. H. Zehnder, receiver, for \$27,500.

The Allyn Brass Foundry Company, maker of brass, bronze and aluminum castings, Cleveland, Ohio, because of the large proportions to which its business has grown with Detroit automobile manufacturers, will establish a branch plant in Detroit. A brick foundry, 80 x 155 feet, will be erected on a site recently purchased by the company on Bellevue avenue, near Mack avenue. The Belt Line Railway passes at the rear of the property, affording excellent shipping facilities. The plant will give employment to about 100 men. The company will not require anything in the line of machinery beyond a few emery stands, tumbling mills, &c.

The receivers of the Delaware River Steel Casting Company, Chester, Pa., have obtained a judicial decree which permits them to sell the insolvent company's plant. There is a mortgage of \$300,000 against the plant, as well as mechanics' liens amounting to something like \$17,000.

Bridges and Buildings.

The St. Paul Foundry Company, St. Paul, Minn., has been awarded contract for repairing the high bridge at St. Paul, destroyed in a storm last August, on a basis of pound prices for material, the total contract, which includes the superstructure, flooring and railing, amounting to approximately \$59,000. Approximately 600 tons of material are involved, of which it is estimated 150 tons of the old material can be used. The contract is to be completed by May 1.

The Elkhart Bridge & Iron Company, Elkhart, Ind., has purchased the plant, stock on hand and all merchandise of the Elkhart Bridge Company, which plant it is now operating. Substantial improvements to the plant are considered but plans are not yet matured.

The State of Pennsylvania has awarded a contract for a new bridge at Penn's Creek, Union County, Pa., to Nelson & Buchanan, Chambersburg, Pa., at their bid of \$12,900. There were 21 bidders for the structure. Several other contracts are to be let within the next four months.

The Noelke-Richards Iron Works, Indianapolis, Ind., has the structural steel and ornamental iron work contracts for the new L. S. Ayers building being erected at Indianapolis. The steel work amounts to about 1600 tons, while the building will call for approximately \$20,000 worth of ornamental iron. The building is to be used as a department store and will be eight stories, 68 x 195 feet.

The Winslow Brothers Company, Chicago, has bought 10 acres of ground lying between West Forty-sixth and Forty-seventh avenues and Van Buren and Harrison streets, and will erect a plant for the manufacture of structural and ornamental sheet metal work. The new plant will be thoroughly modern, most of the buildings being steel construction. The power equipment will be electrical and the general arrangement of buildings and departments will be such as to facilitate the handling of material at the least possible cost. Winslow Brothers Company has been a prominent factor in the metal working trades in Chicago for 20 years, and its business has grown to such an extent that its present quarters at Ada street are inadequate to meet the demands for the company's product. Construction work will begin as early in the spring as weather conditions will permit.

Fires.

A fire which partly destroyed one of the largest buildings of the Farr & Bailey Mfg. Company, Camden, N. J., manufacturer of linoleum and oilcloth, on January 12, entailed a loss of nearly \$40,000.

The National Machine Works, Chicago, Ill., were destroyed by fire January 12. The loss is estimated at \$70,000.

Fire last week almost completely destroyed the machine shop of Ingram & O'Neill, Cincinnati, Ohio. The loss is placed at \$30,000.

The Corn Products Company's large starch plant at Oswego, N. Y., was damaged \$150,000 by fire on January 13.

A fire on January 15 at Enterprise Hill, Irvington, N. J., destroyed the plant of the J. E. Mergott Novelty Company; Joseph Ross, Jr., & Co., manufacturers of manicure novelties, and the Glorier & Woolsey Smelting Works. The combined loss is placed at nearly \$300,000.

The plant of the Kewanee Mining & Mfg. Company, Kewanee, Ill., was recently destroyed by fire. The loss is about \$70,000.

Hardware.

The business of the Sucker State Drill Company, Belleville, has been purchased by the Hayes Pump & Planter Company, Galva, Ill.

The Hunt Vise & Tool Company, Chicago, has been incorporated to manufacture tools and supplies. E. H. Hunt, the president and treasurer of the company, which has offices at 154 Lake street, has been conducting the business for the past seven years.

The Crandall Cutlery Company, Bradford, Pa., has completed an addition, 30 x 40 feet, to its main building and installed a second engine. Another building has also been erected to provide facilities to place on the market the company's special brand of pocket knives having their radium electric finish—that is, full polish—which will be applied to all knives bearing its brand.

The American Fence Company has been organized at Camden, Tenn. The company will establish a factory at Camden for the manufacture of a patent metal fence. D. B. Thomas is president and Dr. E. M. McAuley is vice-president.

The Novelty Shear Company, Chicago, has incorporated with a capital stock of \$2500. Offices are located at 184 La Salle street. The incorporators of the company are H. F. White, D. E. Harris and W. C. McHenry.

The Black Silk Stove Polish Works has been incorporated by L. K. Wynn, Lottie A. Wynn and Fred. C. Angle, at Sterling, Ill. The company is incorporated for \$15,000 and will manufacture stove polish.

The Apex Mfg. Company has been organized at Bloomington, Ill., to manufacture vehicles and farming implements. The incorporators of the company, which is capitalized at \$100,000, are Lee Rust, J. J. Plits and A. Brooks.

The newly organized and incorporated Peoria Drill & Seeder Company, Peoria, Ill., has acquired by purchase the entire interests of Selby, Starr & Co., Peoria, manufacturers of disk, shoe and hoe drills, seeders, harrows, &c., and will take steps to improve the plant through an enlargement of its warehouse capacity. The Peoria Drill & Seeder Company is incorporated at \$125,000, fully paid. Its officers are: Weston Arnold, president; Delos S. Brown, vice-president; C. A. Pattison, secretary and manager; L. E. Roby, treasurer and superintendent. There will be no interruption to business through this change of ownership.

Empire Chain Company, Pittsburgh, Pa., manufacturer of chains, has made an important increase in the capacity of its plant within the last six months. Two new coiling machines, six new hammers and a 100 horse-power Struthers & Wells gas engine have been installed. These improvements, we are advised, have enlarged the company's capacity from 5000 to 6000 pounds per turn.

Henry Disston & Sons, Philadelphia, have received an order from Russia for 2500 Pit saws and one from Japan for a large number of band saws.

The Imbler Fence Machine Company, recently organized, has leased factory buildings at Zionsville, Ind., and will install machinery to make a new design of wire fence, the invention of John Imbler.

Miscellaneous.

The Chicago Motor Vehicle Company, Chicago, Ill., one of the largest manufacturers of automobiles in the West, has been declared bankrupt by Judge Kohlsaat in the United States District Court. Liabilities consist of \$60,000 worth of merchandise claims, \$8000 labor claims, and \$150,000 mortgages on the company's plant at Harvey, Ill. The assets are 10,000 automobiles and the company's factory and machines. An appeal taken from Judge Kohlsaat's decision will continue the fight until next October, when the United States Circuit Court of Appeals will hold a session.

A contract for supplying 5000 water meters of various sizes was awarded last week by the Department of Public Works of Pittsburgh to the Pittsburgh Meter Company, a Westinghouse concern, whose plant is at East Pittsburgh. The total bid of the Pittsburgh Meter Company was \$51,532.25, divided as follows: $\frac{1}{2}$ -inch, \$28,245; $\frac{3}{4}$ -inch, \$7031.25; 1-inch, \$7925; $1\frac{1}{2}$ -inch, \$1008; 2-inch, \$1275; 3-inch, \$1440; 4-inch, \$2308; 6-inch, \$2240. It is the intention of the city of Pittsburgh to meter every water consumer in the near future, which will re-

quire in the neighborhood of 75,000 meters, so that the contract just closed represents but a small portion of the city's prospective purchase of meters.

The Pelton Steel Lintel Company, 583 Greenwich street, New York, has incorporated to manufacture steel lintels. For the present the lintels will be made for the company at an existing plant.

The Ardsley Motor Car Company, Yonkers, N. Y., has incorporated with a capital stock of \$75,000 to make the Ardsley motor car. A well equipped plant has been taken over. F. P. Fuller is president and treasurer; W. S. Howard, vice-president, and A. E. Hunt, Jr., secretary.

The Bryant Steel Wheel & Rim Company, Columbus, Ohio, has been incorporated with \$100,000 capital stock by Richard S. Bryant, W. A. Marsh, Henry F. Kruger, Campbell M. Chittenden, and Herbert L. Thomas. The company will manufacture steel wheels and rims at Columbus.

The Flebeger Heating Company, Akron, Ohio, has been incorporated with \$50,000 capital stock by Frank Flebeger, C. I. Bruner, H. J. Hough, Frank Nolte, and G. M. Flebeger. The company will manufacture a newly patented heating stove. The company will occupy the old Empire shops on Mill street.

The Bucyrus Cement Building Block Company has been organized at Bucyrus, Ohio, and will erect a plant for the production of building blocks, curbing, roofing tile and other concrete building material.

Iron and Industrial Stocks.

NEW YORK, January 18, 1905.

Some important movements occurred during the past week, all of which were in the direction of higher prices. American Steel Foundries preferred, which had sold on Thursday of last week at 54, made a sharp advance, rising to 60½ on Monday and Tuesday of this week, the advance having been based on the reported acquisition of the Simplex Company, Chicago. The common advanced from 13 to 15. Another striking advance was in the case of Crucible Steel preferred, which rose from 60 to 67 in the same time, presumably because of the improved earnings reported for December. The common stock advanced from 11 to 13. The United States Steel stocks showed considerable improvement also, the common rising from 29 to 31½, the preferred from 91½ to 95½ and the new 5's from 92½ to 94. Colorado Fuel rose from 45½ to 48½. Republic preferred from 68½ to 70½ and Tennessee Coal from 70 to 72½. Latest transactions in active stocks up to 1.30 p.m. to-day were made at the following prices: Can common 10½, preferred 63½; Car & Foundry common 33½, preferred 93½; Locomotive common 35, preferred 105; Steel Foundries preferred 60½; Colorado Fuel 47½; Pressed Steel common 38, preferred 89½; Railway Spring common 34½, preferred 94; Republic common 16½, preferred 69; Sloss-Sheffield common 62½, preferred 102; Tennessee Coal 72½; United States Steel common 30¾, preferred 94%, new 5's 93½.

A special meeting of stockholders of the American Iron & Steel Mfg. Company will be held at Lebanon, Pa., on February 27, to vote on the proposed reduction of the capital stock from \$17,000,000 to \$2,550,000 and the number of shares from 340,000 to 51,000 of the par value of \$50.

The Tennessee Coal, Iron & Railroad Company has issued a statement of earnings from January 1 to September 30, 1904. The net earnings during this period amounted to \$1,191,075. Interest guarantees and other charges amounted to \$584,171, leaving a balance of \$606,904. Out of this sum \$211,635 were appropriated for improvements and depreciation, and \$14,440 went to pay the dividends on the preferred stock. The remaining surplus amounted to \$380,829. The general balance sheet of September 30, 1904, is as follows:

Resources.

Land account.....	\$26,084,837
Plant account.....	10,000,783
Deferred charges to operations.....	31,894
Investments (proprietary land companies).....	292,638
Trustees of sinking funds.....	52,940
Treasury securities.....	638,000
Cash.....	429,430
Bills receivable.....	207,923
Accounts receivable.....	1,113,345
Inventory of products and supplies on hand.....	1,419,836
Total	\$40,271,625
<hr/>	
Liabilities.	
Common stock.....	\$22,552,800
Preferred.....	248,300
Bonded debt.....	12,927,000
Guaranteed preferred stock Alabama Steel & Ship Building Company.....	440,000
Reserve funds.....	243,459
Depreciation funds.....	214,191
Bills payable.....	825,000
Accrued interest and unpresented coupons.....	215,416
Audited vouchers, pay rolls and current accounts payable.....	490,463
Profit and loss, 1904.....	380,829
Surplus prior to 1904.....	1,734,162
Total	\$40,271,625

It is stated that the net earnings of the Crucible Steel Company of America for December amounted to \$151,000, making a total for the four months of this company's new fiscal year of \$502,000, in contrast with \$488,000 for the whole year ending August 31, 1904.

Dividends.—The Star Enameling & Stamping Company, Allegheny, Pa., has declared the usual quarterly dividend of 3 per cent.

Tennessee Coal, Iron & Railroad Company has declared a quarterly dividend of 2 per cent. on the preferred stock, payable February 15.

National Fireproofing Company has declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable January 25.

The United Coke & Gas Company.

Announcement is made that the lease of the by-product coke oven business of the United Coke & Gas Company to the Semet-Solvay Company of Syracuse, N. Y., has been terminated. Some time since certain of the large interests in the United Coke & Gas Company, who are also interested in the Barrett Mfg. Company, arranged for the handling of the by-products of the Semet-Solvay Company plants. This led to the plan of bringing the coke oven business proper under one management also. Experience has taught that this arrangement was not advantageous, and the lease was terminated. This puts the United Coke & Gas Company in its former position of exploiting by-product ovens of the Otto-Hoffmann and United-Otto types.

The Board of Directors of the United Coke & Gas Company will be as follows: G. W. Elkins, W. H. Childs, I. D. Fletcher, Stephen Peabody, Albert Strauss, Eversley Childs, S. E. Barrett, Emerson McMillen, R. C. Pruyne, G. D. Widener, Edmund C. Converse, Powell Stackhouse, Dr. F. Schniewind, T. M. Rianhard. The following officers have been elected: G. W. Elkins, chairman; W. H. Childs, president; Dr. F. Schniewind, vice-president; T. M. Rianard, vice-president and treasurer; E. J. Steer, secretary.

The American Coal Products Company, 17 Battery Place, New York, which is the parent company of the United Coke & Gas Company and of the Barrett Mfg. Company, will continue to act as the selling agent for the tar and ammonia produced by both the United-Otto and the Semet-Solvay ovens. The Barrett Mfg. Company has been very assiduous in developing additional channels of consumption for tar and for more fully utilizing the series of products. While at the present time a very considerable part of the tar is used in the manufacture of tarred paper for roofing purposes, a good deal of work has been done in taking up fuel briquette manufacture. The usual arrangement is that the owners or operators of the coke plants sell to the American Coal Products Company the whole of the by-products, with the proviso, however, that the coke maker may, under certain conditions, sell to others if he can secure a better price.

PERSONAL.

The Solid Steel Tool & Forge Company, Farmers' Bank Building, Pittsburgh, Pa., with works at Brackenridge, Pa., has appointed George Ackerman Western sales manager, with headquarters at 11 South Jefferson street, Chicago.

Peter Eyermann is now at Beloit, Wis., where he is engaged with Fairbanks, Morse & Co. in developing his suction gas producers.

A. E. Tower of the Poughkeepsie Iron Company, Poughkeepsie, N. Y., is suffering from an attack of typhoid fever.

John G. A. Leishman, formerly a partner in the Carnegie Steel Company and now only Minister to Turkey, has sailed for Europe.

Edward T. Clymer, blast furnace manager of the Bethlehem Steel Company, has resigned.

The Iron and Metal Trades

With some minor exceptions the markets all along the line have been rather quiet during the past week, and there are some alarmists who show symptoms of uneasiness. The very fact that we are producing and consuming so enormous a quantity for this season of the year seems to inspire doubts as to the possibility of maintaining the pace. On the other hand, the principal preoccupation of other conservative interests is that we may be in danger of a runaway market as the usually busy season, spring, approaches. Powerful influences are arrayed on the side of keeping prices of finished materials at about the present level, with the possible exception of Wire products, and this causes hesitation on the part of smaller manufacturers to book much additional business when they must cover the raw material at the present range of values. Some of them seem to look forward to another period of premiums over official prices for prompt delivery.

In spite of the fact that the Steel Corporation is turning nearly every wheel which it controls the management is forced in many finished lines to pro rate shipments in the order in which specifications have been received, being unable to fill the demands of all. The Steel Corporation is running 94 per cent. of its blast furnace capacity, has every Steel plant except Columbus in operation, is operating 90 per cent. of the Tin Plate mills, 98 per cent. of the Sheet mills and is running full on Tubes, Bars, Plates and Shapes.

A considerable tonnage of ore is being contracted for. Eastern furnacemen have taken several hundred thousand tons of non-Bessemer Mesaba ores on the basis of \$3 per ton, as compared with \$2.40 per ton last year, and the standard Iron contents has been lowered from 54.5 per cent. of Iron, natural state, to 53 per cent. this year. The Eastern furnaces have already bought some considerable quantities of European and Cuban ores, while Eastern home producers are crowded for deliveries beyond their capacity.

The event of the week has been the foreshadowed purchase on the part of the Steel Corporation of 25,000 tons of Bessemer Pig at \$15.50, Valley furnace. Otherwise the crude metal markets have been exceedingly quiet in all the distributing centers.

The attitude of sellers and buyers as to the future has been indicated in the East by the outcome of some large inquiries for the second half of the year. The makers asked an advance of \$1 per ton over present prices, which the sellers declined to consider.

The manufacturers of Steel Bars at a recent meeting reaffirmed the price of 1.40c. at Pittsburgh. The only branch in which there has been somewhat marked activity with an advance of about \$3 per ton has been Skelp. There have been a number of large transactions in Pittsburgh, the eastern and central Pennsylvania mills participating in the business.

The Steel Rail market is quiet. Chicago reports additional orders, among which 20,000 tons for the Illinois Central is enumerated. The Rail makers continue confident, and count on some very heavy orders later on for the West and Southwest.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.
Jan. 19, Jan. 12, Dec. 21, Jan. 20,
1905. 1905. 1904. 1904.

PIG IRON:

Foundry Pig No. 2, Standard,				
Philadelphia	\$17.50	\$17.50	\$17.25	\$14.75
Foundry Pig No. 2, Southern,				
Cincinnati	16.25	16.25	15.75	12.50
Foundry Pig No. 2, Local, Chicago	17.50	17.50	17.00	14.00
Bessemer Pig, Pittsburgh.....	16.85	16.85	16.85	13.85
Gray Forge, Pittsburgh.....	16.25	16.25	15.85	12.75
Lake Superior Charcoal, Chicago	18.50	18.50	18.50	16.75

BILLETS, RAILS, &c.:

Steel Billets, Pittsburgh.....	23.00	23.00	21.00	23.00
Steel Forging Billets, Pittsburgh	25.00	...	...	...
Steel Billets, Philadelphia.....	25.50	25.00	25.00	24.50
Steel Billets, Chicago.....	25.00	25.00	24.00	24.00
Wire Rods, Pittsburgh.....	31.00	31.00	30.00	30.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:

O. Steel Rails, Chicago.....	16.00	16.00	15.50	10.00
O. Steel Rails, Philadelphia....	17.75	17.75	17.00	12.00
O. Iron Rails, Chicago.....	21.00	21.00	22.00	15.00
O. Iron Rails, Philadelphia....	22.50	22.50	20.00	16.00
O. Car Wheels, Chicago.....	16.50	16.50	16.50	13.50
O. Car Wheels, Philadelphia....	16.00	16.00	15.00	13.00
Heavy Steel Scrap, Pittsburgh....	16.00	16.50	16.50	13.50
Heavy Steel Scrap, Chicago....	15.00	15.00	14.25	10.00

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia.	1.70	1.65	1.63½	1.35
Common Iron Bars, Chicago....	1.65	1.65	1.65	1.40
Common Iron Bars, Pittsburgh....	1.69%	1.69%	1.54½	1.29%
Steel Bars, Tidewater.....	1.54½	1.54½	1.54½	1.44½
Steel Bars, Pittsburgh.....	1.40	1.40	1.40	1.30
Tank Plates, Tidewater.....	1.64½	1.64½	1.64½	1.74½
Tank Plates, Pittsburgh.....	1.50	1.50	1.50	1.60
Beams, Tidewater.....	1.64½	1.64½	1.64½	1.74½
Beams, Pittsburgh.....	1.50	1.50	1.50	1.60
Angles, Tidewater.....	1.64½	1.64½	1.64½	1.74½
Angles, Pittsburgh.....	1.50	1.50	1.50	1.60
Skelp, Grooved Steel, Pittsburgh	1.55	1.45	1.45	1.50
Skelp, Sheared Steel, Pittsburgh	1.60	1.50	1.50	1.50
Sheets, No. 27, Pittsburgh.....	2.20	2.20	2.10	2.20
Barb Wire, Pittsburgh.....	2.20	2.20	2.20	2.50
Wire Nails, Pittsburgh.....	1.75	1.75	1.75	1.90
Cut Nails, Pittsburgh.....	1.75	1.75	1.75	1.75

METALS:

Copper, New York.....	15.25	15.12½	14.87½	12.75
Spelter, St. Louis.....	6.10	6.15	5.70	4.70
Lead, New York.....	4.60	4.60	4.60	4.45
Lead, St. Louis.....	4.52½	4.52½	4.52½	4.40
Tin, New York.....	29.25	29.05	29.00	28.50
Antimony, Hallett, New York...	8.50	8.75	8.75	6.50
Nickel, New York.....	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York.....	3.74	3.74	3.64	3.70

Chicago.

FISHER BUILDING, January 18, 1905.—(By Telegraph.)

The dead calm which has succeeded the stirring times of the past two months is somewhat alarming, and there are many veterans in the trade who look for a decided break if the present apathy among buyers is maintained for some weeks longer. There is little doubt that the producing interests are at the present time turning out materials at a more rapid rate than the present consumption warrants, but there is hope that the actual demand for Pig Iron, Billets and Finished Materials may be blessed with a natural increase sufficient to take up the slack and to prevent a serious break. The impression prevails that high prices on Pig Iron and Finished Materials were caused by some powerful manipulative element and that the manipulators, having accomplished their purpose, are less zealous in their bull arguments than they were a month ago. Northern Pig Iron is unchanged, while Southern Pig Iron makers are endeavoring, in the face of practically no demand, to advance their prices. From \$1 to \$2 a ton premium is still charged for Billets, but the demand is light. There is very little trading in Structural Steel or Plates. Thirty-four thousand tons of Standard Section Rails went to the leading Western mill during the last week, of which about 20,000 tons are understood to have come from the Illinois Central Railroad for extension work in and near Chicago. Sheets are comparatively quiet and the date of opening the Inland Sheet Mill is postponed indefinitely, March being the month now spoken of. Demand for Bars is less than it has been, but prices are firm on Iron Bars owing to the high cost of Scrap in the mill yards. The Emlyn Works is preparing to resume operations, but actual resumption is not likely until prices advance still further. Trading in tubular goods, both Iron and Steel, is light. A strong tone pervades the Cast Pipe market. The Coke situation is a little easier, but prices are firm.

Pig Iron.—In the face of a very decided slackening in demand producers of Southern Iron are endeavoring to advance their prices, and many furnaces have refused to accept further business on the old \$1.50 basis. Northern producers, evidently more closely in touch with the consuming situation, have made no advances and are rather more amenable to reason on prices and deliveries. The South has unusual difficulties to contend with in the shape of shortage of Coke and inefficiency of labor due to unusually cold weather for that district, and as a consequence there is a decrease in the productive capacity of the furnaces which is taken advantage of in the shape of higher prices. We repeat the minimum prices, even on Southern Iron, and indicate the advancing tendency of that market by naming a differential of 25c. between high and low prices. This differential in some cases is held at 50c., as there are some producers that are holding their minimum on the basis of \$14, but these are so far in the minority that we do not this week make them our official prices. We quote:

Lake Superior Charcoal	\$18.50 to \$19.00
Northern Coke Foundry, No. 1	to 18.00
Northern Coke Foundry, No. 2	to 17.50
Northern Coke Foundry, No. 3	to 17.00
Northern Scotch, No. 1	18.00 to 18.50
Ohio Strong Softeners, No. 1	19.30 to 19.80
Ohio Strong Softeners, No. 2	18.80 to 19.30
Southern Silvery, 4 to 6 per cent. Silicon	18.65 to 19.65
Southern Coke, No. 1	17.65 to 17.90
Southern Coke, No. 2	17.15 to 17.40
Southern Coke, No. 3	16.65 to 16.90
Southern Coke, No. 4	16.40 to 16.65
Southern Coke, No. 1 Soft	17.65 to 17.90
Southern Coke, No. 2 Soft	17.15 to 17.40
Southern Gray Forge	16.50 to 16.75
Southern Mottled and White	15.90 to 16.15
Malleable Bessemer	to 17.50
Standard Bessemer	18.50 to 19.00
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	20.30 to 22.30
Jackson County and Kentucky Silvery, 10 per cent. Silicon	to 23.30
Alabama Basic	17.15 to 17.40
Virginia Basic	17.15 to 17.40

Old Materials.—The market is undeniably weak, with practically no demand. The Illinois Central offered about 2000 tons last Friday, of which but little over half was actually sold, and that at prices lower than had ruled previously. The Rock Island is out with a list that will be closed a little later this week, and prices being reduced still further illustrate the weak condition of the market. In the following prices the reductions named as compared with last week are based on actual transactions, while quotations on a number of lines which have been unchanged might be considered nominal because there has not been sufficient trading to make a market. We quote per gross ton:

Old Iron Rails	\$21.00 to \$21.50
Old Steel Rails, 4 feet and over	16.00 to 16.50
Old Steel Rail's, less than 4 feet	16.00 to 16.25
Heavy Relaying Rails, subject to inspection	22.50 to 23.00
Heavy Relaying Rails, for side tracks	20.00 to 20.50
Old Car Wheels	16.50 to 16.75
Heavy Melting Steel Scrap	15.00 to 15.50
Frogs, Switches and Guards	15.00 to 15.50
Mixed Steel	10.00 to 10.50

The following quotations are per net ton:

Iron Fish Plates	\$19.00 to \$19.50
Iron Car Axles	22.50 to 23.00
Steel Car Axles	17.00 to 17.50
No. 1 Railroad Wrought	18.25 to 18.50
No. 2 Railroad Wrought	17.00 to 17.50
Shafting	17.50 to 18.00
No. 1 Dealers' Forge	14.50 to 15.00
Wrought Pipes and Flues	12.50 to 13.00
No. 1 Cut Busheling	13.00 to 13.25
Iron Axle Turnings	12.25 to 12.75
Soft Steel Axle Turnings	12.25 to 12.75
Machine Shop Turnings	11.75 to 12.00
Cast Borings	9.00 to 9.25
Mixed Borings, &c.	9.00 to 9.25
No. 1 Mill	9.75 to 10.00
Country Sheet	8.50 to 9.00
No. 1 Boilers, cut to Sheets and Rings	12.00 to 12.50
No. 1 Cast Scrap	14.00 to 14.50
Stove Plate and Light Cast Scrap	11.50 to 12.00
Railroad Malleable	14.00 to 14.50
Agricultural Malleable	13.00 to 13.50

Cast Iron Pipe.—No contracts of moment have been closed during the week under review, but a number of fairly large tonnages are being figured on. Prices are unchanged and firm at \$28.50 a gross ton for 4-inch Water Pipe and \$27.50 for 6-inch and larger, with \$1 extra for Gas Pipe.

Coke.—The situation is a little less tense than it was a week ago. Prices are firm. Connellsburg Foundry Coke is offered at from \$5.40 to \$5.65 for strictly 72-hour Foundry, and about 25c. less for Furnace quality. West Virginia Cokes are quotable at about \$2.50 at the ovens or \$5.15, Chicago. Wise County, Va., Cokes can be had at from \$4.50 to \$4.75, Chicago.

Metals.—Copper has advanced 1/4c., Casting being held at 15 1/4c. to 15 1/4c. and Lake at 15 1/4c. to 15 1/4c., in car lots, with 1/4c. to 1/2c. higher for small lots. Lead is quoted at 4.62 1/2c. in 50-ton lots, 4.67 1/2c. in car lots and 5c. to 5 1/4c. in small lots. Pig Tin remains steady at 30c. to 30 1/2c. in car lots. Spelter is quoted at 6c. in car lots and 6 1/2c. up for small lots. Sheet Zinc is held at \$7.50, base, La Salle,

equivalent, after deducting discounts, to \$7.25, Chicago, for car lots of 600-lb. casks, with small lots selling at \$7.50 to \$8. Old Metals are unchanged, as follows: Copper Wire, 13 3/4c.; Heavy, 13 1/4c.; Copper Bottoms, 12c.; Copper Clips, 12 1/4c.; Red Brass, 11 1/2c.; Red Brass Borings, 10c.; Yellow Brass, Heavy, 9c.; Yellow Brass Borings, 7 1/2c.; Light Brass, 7 1/4c.; Lead Pipe, 4 1/4c.; Tin Lead, 4c.; Zinc, 4 1/2c.; Pewter, No. 1, 19 1/4c.; Block Tin Pipe, 25c.

(By Mail.)

Billets.—Billets are still held at a premium. Bessemer Billets, while officially quoted \$24, are at an actual minimum of \$25 for base size 16 square inches in section and larger up to but not including 100 square inches, and \$27 for Bessemer Billets larger than 100 square inches in section. Open Hearth Forging Billets are held by all producers at from \$28 to \$32 a ton, in spite of the fact that the official price of \$26 is nominally in force. Sheet and Tin Plate Bars are still held at premiums ranging from \$1 to \$3 a ton above official Billet pool price.

Rails and Track Supplies.—Thirty-four thousand tons of Standard Section Rails have been booked by the Illinois Steel Company since last week's report, making a total of considerably over 315,000 tons, or about 40 per cent. of the tonnage understood to be booked by all the Rail mills of the country. Prices are firm on the following basis: Standard Section Rails, \$28 per gross ton, at mill, in 500-ton lots or greater, plus full freight to destination; Light Rails from \$24 to \$30, according to weight, in car lots, at mill; Angle Bars, 1.35c. to 1.40c., f.o.b. mill; Spikes, 1.70c. to 1.75c.; Track Bolts, 2.30c. to 2.45c. Store prices on Track Supplies range from 15c. to 20c. per 100 lbs. above mill prices.

Structural Material.—None but small orders have been booked during the last week, though some good round ones are being figured on. Mills, however, are so full of business that they are all six to eight weeks behind their orders on Light Sections and three to four weeks on Heavy. We quote: Beams and Channels, 3 to 15 inches, inclusive, 1.66 1/4c.; Angles, 3 to 6 inches, 1/4-inch and heavier, 1.66 1/4c.; Angles, larger than 6 inches on one or both legs, 1.76 1/2c.; Beams, larger than 15 inches, 1.76 1/2c.; Zees, 3 inches and over, 1.66 1/2c.; Tees, 3 inches and over, 1.71 1/2c., with the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. Local jobbers quote the minimum price on Angles, Beams and Channels, 1.90c., with 10c. advance for 18, 20 and 24 inch Beams and for Angles larger than 6 inches on one or both legs. These prices are for either random lengths or cut to lengths, but 10c. to 15c. higher is charged for very small or wasteful odds.

Plates.—No orders of consequence have been booked within the last week, though specifications on contracts are unusually large, particularly from the car industries. Official prices at Chicago for shipment from mill in car lots are: Tank quality, 1/4-inch and heavier, wider than 14 and up to 100 inches wide, carloads, Chicago, 1.66 1/4c.; 3-16 inch, 1.76 1/2c.; Nos. 7 and 8 gauge, 1.81 1/2c.; No. 9, 1.91 1/2c.; Tank quality, 14 inches wide to 6 inches, 10c. below these prices; Flange quality, any width up to 100 inches, 1.76 1/2c.; Sketch Plates, in Tank quality, 1.76 1/2c.; in Flange quality, 1.86 1/2c. Store prices on Plates are as follows: Tank Plates, up to 100 inches wide, 1/4-inch and heavier, 1.90c. to 2c.; 3-16 inch up to 72 inches wide, 2c. to 2.10c.; No. 8, up to 60 inches wide, 2c. to 2.10c.; lower gauges are quoted under the headings of Sheets. Beyond the base widths named extras from 10c. to 25c. per 100 lbs. are charged for wider widths; Flange quality is usually charged at 25c. extra.

Sheets.—Business is improving somewhat, and the high cost of Sheet Bars makes it impossible for independent Sheet mills to cut prices much below the official figures: Nos. 9 and 10, 1.81 1/2c.; Nos. 11 and 12, 1.86 1/2c.; Nos. 13 and 14, 1.91 1/2c.; Nos. 15 and 16, 1.96 1/2c.; Nos. 18 and 20, 2.21 1/2c.; Nos. 22 and 24, 2.26 1/2c.; Nos. 25 and 26, 2.31 1/2c.; No. 27, 2.36 1/2c.; No. 28, 2.46 1/2c.; No. 29, 2.61 1/2c.; No. 30, 2.71 1/2c. Store prices rule as follows: Blue Annealed Sheets, No. 10, 2.05c. to 2.15c.; No. 12, 2.10c. to 2.20c.; No. 14, 2.20c. to 2.30c.; No. 16, 2.30c. to 2.40c.; Nos. 18 and 20, 2.45c. to 2.50c.; Nos. 22 and 24, 2.50c. to 2.60c.; No. 26, 2.55c. to 2.65c.; No. 27, 2.60c. to 2.70c.; No. 28, 2.70c. to 2.80c. Galvanized Sheets, while not officially advanced, rule higher in tone and in some instances the prices have been advanced. The official prices remain as follows, f.o.b. Chicago, in car lots: Nos. 16, 2.61 1/2c.; Nos. 18 and 20, 2.76 1/2c.; Nos. 22 and 24, 2.91 1/2c.; No. 26, 3.11 1/2c.; No. 27, 3.31 1/2c.; No. 28, 3.51 1/2c. These prices range from 75, 10 and 10 at Pittsburgh in the heavier gauges to 80 and 2 1/2 in the lighter. Store discounts on Galvanized Sheets range as follows, f.o.b. Chicago warehouse: Nos. 10, 12 and 14, 75 per cent. to 70 and 10; Nos. 15, 75 and 2 1/2 to 70, 10 and 5; Nos. 18 and 20, 75 and 7 1/2 to 75; No. 22 and lighter up to 36 inches wide at 75 and 10 to 75 and 2 1/2; all Sheets more than 36 inches wide in any gauge are held at a minimum of 70 and 10 and range from there to 70 and 5 discount.

Bars.—The trade seems to expect advances on Soft Steel Hoops and also possibly on Soft Steel Bars in the near

future, but nothing has been done yet. Specifications are excellent, particularly from implement and car building firms, both for Iron and Steel Bars. Mills are full of business and several weeks behind their orders. Bessemer and Open Hearth Steel Bars are firm at 1.56½c., base, half extras, Chicago, in car lots; Iron Bars at 1.65c., base, half extras, in car lots; Soft Steel Hoops at 1.71½c. rates, full extras, in car lots; Soft Steel Angles, Channels, Tees and Shapes belonging to the Bar class, 1.66½c., half extras, Chicago, in car lots. Quantity differentials are added to the regular extras for size and for less than car lots, as follows: Less than 2000 lbs. down to 1000 lbs. of a size, 10c. extra; less than 1000 lbs. of a size, 30c. extra. Store prices on Bars are 1.75c., minimum, for both Iron and Steel, with half extras on Steel and full extras on Iron, with 1.85c., minimum, half extras, on Angles and Shapes, and 2.10c., minimum, full extras, on Steel Hoops.

Merchant Steel.—Mills have so much business on their books that all pressure for new business comes from the buyers rather than the sellers. The tendency on the part of large consumers is to endeavor to increase the tonnage on their present contracts at old prices. There is no doubt that the consumption of the great number of lines that are usually classed under this heading will be exceptionally large during this year. Prices are unchanged. We quote: Open Hearth Spring Steel is being held at 2c., Chicago, to the general trade. Other prices, based on the new Bar schedule of December 20, are: Smooth Finished Machinery Steel, 1.81½c.; Smooth Finished Tire, 1.76½c.; Flat Sleigh Shoe, 1.61½c.; Concave and Convex Sleigh Shoe, 1.76½c.; Cutter Shoe, 2.30c.; Toe Calk Steel, 2.11½c.; Railway Spring, 1.76½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up. Shafting is unchanged for the present at 52 per cent. discount in car lots and 47 per cent. in less than car lots in base territory.

Merchant Pipe.—Business for the first 15 days of 1905 is reported to be excellent. Present official prices, Chicago, in car lots to consumers are:

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
½ and ⅓ inch.....	66.85	50.85	64.85	48.85
¾ and ⅔ inch.....	70.85	58.85	68.85	56.85
⅔ to 6 inches.....	74.85	64.85	73.35	63.35
7 to 12 inches.....	69.85	54.85	68.35	52.85
Extra strong, plain ends, ½ to ¾ inch.....	59.85	47.85	57.85	45.85
¼ to 4 inches.....	66.85	54.85	64.85	52.85
4½ to 8 inches.....	62.85	50.85	60.85	48.85
Double extra strong, plain ends.....	55.85	44.85	53.85	42.85

Boiler Tubes.—Official prices remain unchanged, being the same as they have been since early last November. The following are the official discounts on less than car lots at Chicago for shipment from mill:

	Steel.	Iron.	Seamless
1 to 1½ inches.....	44.35	41.35	52.35
1½ to 2½ inches.....	56.35	41.35	40.35
2½ inches.....	58.35	46.35	43.35
2½ to 5 inches.....	64.35	53.35	{ up to 4 in. 50.85
6 to 13 inches.....	56.35	41.35	50.85

Car lots carry two points better discounts. Independent mills are offering car lots freely at the prices named below, while large less than car lots can occasionally be obtained at the same prices by paying the differential between car and less than car freight. The following discounts are f.o.b. Chicago:

	Steel.	Iron.	Seamless.
1 to 1½ inches.....	48.35	42	55
1½ to 2½ inches.....	60.35	45	48
2½ inches.....	62.35	50	49
2½ to 5 inches.....	68.35	57½	52½
6 to 13 inches.....	60.35	45	..

Store prices are about as follows, higher or lower discounts being offered depending upon the size of order:

	Steel.	Iron.	Seamless
1 to 1½ inches.....	42½	37½	40
1½ to 2½ inches.....	52½	35	37½
2½ inches.....	55	37½	40
2½ to 5 inches.....	62½	47½	47½
6 inches and larger.....	52½	..	..

Garson Myers, Steel and Heavy Special Machinery agent, has removed temporarily to Room 1100, Merchants' Loan and Trust Building, Chicago.

T. A. Nichols, formerly connected with the engineering department of the Pressed Steel Car Company, has entered the employ of Dravo, Doyle & Co., merchant engineers, Pittsburgh. He will give special attention to the West Virginia territory and the appliances of the Ball Engine Company, De Laval Steam Turbine Company and the Harrison Safety Boiler Works, all of which Dravo, Doyle & Co. represent. J. J. Rost, for some time connected with the Pittsburgh office, has been transferred to the Cleveland office, where he will assist C. B. Kelley, manager of that office.

Cincinnati.

FIFTH AND MAIN STS., January 18, 1905.—(By Telegraph.)

Pig Iron.—The market during the past week has shown no material change, and conditions are practically the same as they have been since the opening of the new year. There is apparently no less strength manifest, but there is an absence of the activity and aggressiveness that were very much in evidence up to the close of the preceding year. This condition was, in a measure, anticipated by the trade in general, and is considered nothing more than a healthy reaction after a season of very great bustle and activity. It is the sentiment of agents generally that consumers at that time fully anticipated their needs for a long period in advance and consequently will not be in the market to any great extent until this supply is exhausted. Probably the most distinctive feature is the almost entire absence of anything that might be termed inquiry, which during the past ten days has been almost nothing. It is true there have been some sales made of more or less tonnage in the Eastern district, but three or four transactions comprise the entire week's business. The Southern furnaces are said to feel very bullish on the situation and are practically sold up for the first quarter, with the possible exception of some odd lots of several grades. There is, however, a disposition shown to make contracts for the second quarter, which we are advised has been done in a number of instances. Southern No. 2 is still firm at \$13.50, Birmingham, with a few sales said to have been made at a slight advance over this quotation, but of such small moment as to form no basis for establishing a higher figure than quoted above. Northern No. 2 is firm at from \$16 to \$16.50 at furnace, with inquiry less active than for some weeks past. We are advised of one sale of Ohio Silvery No. 1 of 500 tons that went at \$20, furnace, and was consigned to a large concern in northern Ohio; 500 tons of Southern No. 2 at \$13.50, Birmingham basis, was also purchased by a northern Ohio industry. These sales probably represent the bulk of the transactions that have taken place during the week, any other sales that were made being in comparatively small lots. The leading Pipe industry is said to be willing and ready to buy almost any quantity of Iron that may be available at its figure. Freight rates from Hanging Rock district to Cincinnati, \$1.15, and from Birmingham, \$2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	to \$16.75
Southern Coke, No. 2.....	to 16.25
Southern Coke, No. 3.....	to 15.75
Southern Coke, No. 4.....	to 15.50
Southern Coke, No. 1 Soft.....	to 16.75
Southern Coke, No. 2 Soft.....	to 16.25
Southern Coke, Gray Forge.....	to 15.25
Southern Coke, Mottled.....	\$14.75 to 15.00
Ohio Silvery, No. 1.....	20.65 to 21.15
Lake Superior Coke, No. 1.....	17.65 to 18.15
Lake Superior Coke, No. 2.....	17.15 to 17.65
Lake Superior Coke, No. 3.....	16.65 to 17.15

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....\$18.50 to \$19.00
Lake Superior Car Wheel and Malleable 18.00 to 18.50

Coke.—Demand is good, with the supply limited. It is not so much a question of price with consumers as it is of delivery. From all reports the ovens are yielding almost their full quota, but it is absolutely impossible to secure sufficient equipment to transport the Coke as desired. This in many instances causes severe strictures and agents are harassed continually in their efforts to protect their customers. The best grades are selling at from \$3 to \$3.25, f.o.b. ovens.

Plates and Bars.—Owing to the large number of contracts placed just prior to the close of December the month of January thus far is placed in strong contrast. This temporary lull is, however, causing no anxiety; in fact, it is but a repetition of the years that preceded. There are no changes in prices, which are strong and firm. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.65c., with half extras; the same in smaller lots, 1.90c., with full extras; Steel Bars, in carload lots, 1.53c., with half extras; the same in smaller lots, 1.75c., with full extras; Base Angles, 1.63c., in carload lots; Beams and Channels, in carload lots, 1.63c.; Plates, ¼-inch and heavier, 1.63c., in carload lots; in smaller lots, 1.90c.; Sheets, 16-gauge, in carload lots, 2.15c.; smaller lots, 2.70c.; 14-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; Steel Tire, ¾ x 3-16 and heavier, 1.73c., in carload lots.

Old Material.—The demand for this class of material is good and dealers have no difficulty in disposing of their stock as rapidly as they desire. Prices, so far as we can get the information, are unchanged. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, \$17 to \$18 per net ton; No. 1 Cast Scrap, \$14 to \$14.50 per net ton; Iron Rails, \$21.50 to \$22 per gross ton; Steel Rails, rolling mill lengths, \$14.50 to \$15 per gross ton; Relaying Rails, 56-lb. and upward, \$23 per gross ton; Iron Axles, \$21 to \$22 per net ton; Car Wheels, \$15 to \$16 per gross ton; Heavy Melting Scrap, \$14.50 to \$15 per gross ton; Low Phosphorus Scrap, \$17 to \$18 per gross ton.

Philadelphia.

FORREST BUILDING, January 17, 1905.

The situation in the Iron and Steel trade is hardly so strong as it was during several preceding weeks. It cannot be said that there is any deterioration in business conditions, but the past two or three months seems to have discounted a great deal of what has since been realized. That an enormous consumption is going on is shown by the furnace report which was published last week, but to expect further development along that line in the midst of winter is probably not warranted. Be that as it may, it will be necessary to see further ahead before assuming that 1905 is likely to be much larger or as erratic in its movements as 1902 was. The trade is confronted with tariff and other agitations, so that there are special reasons why prices should not be advanced immediately. It is true that cost of production is high and that there is very little money in manufacturing Iron and Steel at to-day's prices, but if buyers will possess their souls in patience they need not pay much, if any, higher prices and may get all the material they are likely to need. Capacity for production in all lines is very large, and while consumption is expected to be in proportion, it will probably be less subject to fits and starts than it was two or three years ago.

Pig Iron.—The market is less buoyant than it was two or three weeks ago, and, while it is not at all weak, there are spots which are soft enough to attract some attention. There is no reason to suppose that the situation is less favorable than it was believed to be, but the output of Pig Iron is very large, and it will probably be still larger inside of 30 days; so that, with prospects of full supplies, buyers are not as anxious to bid for Iron as they were a month ago. As already stated, this does not necessarily imply either weakness or excessive supplies, but it shows that there is a "catching up" in some lines, and suggests the possibility of its being so in others in the near future. Mill Irons, as we said last week, are in good supply and have been sold at less than \$16, delivered, for very good makes, and in some locations are still available at that figure or a little less. Moreover, the fact that shipments have been made several weeks in advance of dates specified is confirmatory evidence that there is plenty of Iron of that grade, although Foundry Irons are said to be really scarce. The significant feature is that the scarcity is not so great as it was in November and December, when all grades were scarce, and there was considerable fear that there might not be enough to go around during the late winter and the early spring months. This feeling is less prevalent to-day, however, and, while the demand is not likely to suffer any impairment, the indications in regard to supply are less disquieting than they were several weeks ago. Cost of production will be greater, and this will have a tendency to limit the output, unless prices can be maintained at the present or a higher range of prices. To-day's quotations are about the same as last week, strong on Foundry grades, but a little easy on Mill Irons—viz., for Philadelphia and nearby deliveries:

No. 1 X Foundry.....	\$17.75 to \$18.00
No. 2 X Foundry.....	17.50 to 17.75
No. 2 Plain.....	16.75 to 17.00
Standard Gray Forge.....	16.00 to 16.25
Ordinary Gray Forge.....	15.25 to 15.50
Basic.....	to 16.50
Low Phosphorus.....	20.00 to 20.25

Steel.—The demand is not urgent, although there is a disposition to place orders for long deliveries, which makers are not encouraging. Specifications come in rather slowly, but new business cannot be placed below \$25.50 and upward for deliveries in buyers' yards. Something very desirable as to quantity and deliveries might be taken at a slight concession, but it would depend on the kind of order it was, and would have to be specified at once.

Muck Bars.—There is some demand, with sales at \$29.50 to \$29.75, delivered, but \$29 is about the best bid to-day.

Plates.—The mills are doing fairly well, but they are not rushed with business, specifications being rather slow. The car shops are not using the same tonnage of Plates as they recently did, but they are using more Structural Material, which while it will help the latter is rather hurtful to the Plate mills. The difference may not be very great, but it is mentioned in the trade as something worth noting. The outlook for business is very good, however, and the probabilities are that all departments will be fully employed in the near future. Prices unchanged as follows:

	Part Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel, over 14 inches wide.....	1.63½	1.63½
Tank, Bridge and Boat Steel, rectangular Plates, 14 inches wide and under.....	1.53½	1.58½
Flange or Boiler Steel.....	1.73½	1.75½
Marine, A. B. M. A. and Commercial Fire Box Steel.....	1.83½	1.88½
Still Bottom Steel.....	1.93½	1.98½
Locomotive Fire Box Steel.....	2.13½	2.18½
The above are base prices for $\frac{1}{4}$ -inch and heavier. The following extras apply:	Per 100 3-16-Inch thick.....	\$0.10 pounds extra.
Nos. 7 and 8. B. W. G.....	.15	"

	Per 100 pounds extra.
No. 9 B. W. G.....	.25 "
Plates over 100 to 110 inches.....	.05 "
Plates over 110 to 115 inches.....	.10 "
Plates over 115 to 120 inches.....	.15 "
Plates over 120 to 125 inches.....	.25 "
Plates over 125 to 130 inches.....	.50 "
Plates over 130 inches.....	1.00 "

Structural Material.—The week's business has been very satisfactory and prospects continue to be of the most hopeful character. The demand is mostly for small and moderate sized lots, but it keeps the mills well employed, so that on the whole the situation is quite cheerful. Prices are as follows: Beams, Channels and Angles, 1.63½c. to 1.75c., according to specifications, and small Angles, 1.55c. to 1.60c.

Bars.—The Bar trade is not dull by any means, but it is not quite so buoyant as it was two or three weeks ago. The higher price for Refined Iron has thrown an increased proportion of business to the Steel mills, but appearances indicate that there will be plenty of demand for both Iron and Steel. Specifications are coming in rather slowly, but this is thought to be a temporary condition and will soon give place to urgency for deliveries. Prices are 1.70c. to 1.73½c. for Refined Iron; some quote more, but good orders would probably not be turned down at the inside figure if prompt specifications were guaranteed. Steel Bars are nominally 1.53½c., but it is difficult to get deliveries at that figure, and 1.55c. to 1.60c. would have to be paid to secure satisfactory shipments.

Sheets.—Fairly good demand mostly for spring deliveries, which manufacturers are not disposed to encourage at ruling prices.

Old Material.—A decided quietness has come over the market during the past few days, and, while prices cannot be said to be lower, they probably would be if any attempt was made to realize on a few large lots. Holders appear to have got to a point at which buyers are determined not to follow, so that more business is being done at the inside or medium figures than at the outside, the latter being, in most cases, what sellers ask for lots delivered in buyers' yards; today's bids and offers would be about as follows:

Old Steel Rails.....	\$17.75 to \$18.00
No. 1 Steel Scrap.....	17.50 to 18.00
Old Steel Axles.....	20.00 to 20.50
Old Iron Axles.....	23.00 to 24.00
Old Iron Rails.....	22.50 to 23.00
Old Car Wheels.....	16.00 to 16.50
Choice Scrap, R. R. No. 1 Wrought.....	20.50 to 21.50
No. 1 Yard Scrap.....	19.00 to 19.50
Long and Short.....	18.25 to 18.75
Machinery Scrap.....	16.00 to 16.50
Low Phosphorus Scrap.....	21.00 to 22.00
Wrought Iron Pipe.....	16.00 to 16.50
No. 1 Forge Fire Scrap.....	16.00 to 17.00
No. 2 Forge Fire Scrap, Ordinary.....	11.50 to 12.00
Wrought Turnings.....	14.50 to 15.00
Wrought Turnings, Choice Heavy.....	16.00 to 16.50
Cast Borings.....	11.50 to 12.00
Stove Plates.....	14.00 to 14.25

Birmingham.

BIRMINGHAM, ALA., January 16, 1905.

In only one feature has there been any change in the Iron market since last report. A prominent Pipe interest was very active in feeling the market the past week. Some whose prices failed to capture the business, or a part of it, are inclined to think that part of its requirements were placed. While your correspondent is rather inclined that way, too, nothing definite concerning it can be said. The probability is some Iron changed hands on "private terms." It was no secret in the market that the company was prepared to take a round lot at agreeable terms. No one can state with certainty that it got it.

There has been no change in prices. Some analysis Iron was wanted and it commanded, as usual, a premium over regular values. Some No. 1 Soft for delivery during this quarter, running a specified per cent. in silicon, was sold at \$14.50. But the amount sold was of no moment and its stopping place was in Southern territory. There was another lot running 2½ per cent. silicon that went at the same price, and there was one lot that went at \$14.25. But they were all small lots. No. 2 Foundry, regular, sold at \$14 and some at \$13.75, but none of the sales were of any significance. No. 2 Soft was held at the price of No. 2 Foundry with light sales. No. 3 Foundry and the lower grades were held at the lower usual difference. Quotations of these grades are almost nominal, as they continue to be very scarce and are very hard to obtain, even for insignificant amounts. For the second quarter there were a few orders in on the basis of \$13.75 for No. 2 Foundry, but they were declined by the sellers in receipt of them, and \$14 was asked. There was no resulting business.

There is as yet no sign of any increased output, and your correspondent can see no probability of there being any in the near future. He is rather inclined to the belief that it will require good management to maintain our present output. Deliveries on sales already made will absorb that for this quarter. The question of getting the Iron to deliver on sales made is bound to be a puzzle to some with whom calculations have miscarried.

There is some talk of a slight increase to furnace capacity. It has been definitely decided by the Tutwiler Coal & Iron Company to build another furnace stack in the near future to meet increasing business. It will be erected at the present furnace plant. Negotiations are in progress now concerning certain properties which, if concluded successfully, will insure the erection of more furnaces. The probability of the latter is favorable, but it is not yet positive.

The Dimmick Pipe Works has determined upon an increase of its capacity and will erect an addition to the present plant of sufficient size to increase the daily output 100 tons. The company has been cramped for some time for want of facilities to care for the business that came to it and has finally determined to provide for it by an enlargement of the plant. None of the particulars are available, as the general manager is in the East, maturing the plans with other officials.

Not much is to be said of the Coal trade. There is a fine trade for all that can be mined and shipped and the supply is materially less than the demand. Operators report that their mines are still filling up with both union and nonunion miners and that they are progressing favorably. All the union miners have not yet returned to work, and those who are idle are yet receiving weekly rations. But the matter is rarely discussed now, as it is accepted as a fact that the strike is a failure.

The bank merger, of which mention has been made, was concluded last week and the American Trust & Savings Bank absorbed the Alabama National Bank. The latter is undergoing liquidation and is now an affair of the past.

The big combination of certain Coal and Iron interests heretofore mentioned as being on the tapis has not yet been concluded, but from information that has leaked to your correspondent the negotiations are still on, with every indication of successful conclusion. It will be a great help to the district.

Pittsburgh.

PARK BUILDING, January 18, 1905.—(By Telegraph.)

Pig Iron.—An interesting feature of the market is that some consumers are willing to buy for second quarter at present prices, and we note sales of 5000 to 6000 tons of Bessemer and Basic for April, May and June delivery on the basis of \$16, Valley furnace. There is a fair amount of inquiry, but the market generally is quiet. We quote Bessemer and Basic at \$15.75 to \$16, Valley furnace, for ordinary tonnage and for first quarter delivery. To very large consumers like the Steel Corporation and other leading interests it is probable a price of \$15.50, at furnace, would be made. There is some inquiry for Foundry Iron, a local consumer having bought yesterday about 500 tons of No. 2 on the basis of \$16, Valley furnace. We quote Northern No. 2 Foundry at \$16 to \$16.25, Valley furnace, equal to \$16.85 and \$17.10, Pittsburgh. There is moderate buying in Forge Iron, and we quote Northern makes at \$15.40, Valley, or \$16.25, Pittsburgh. We note sales of about 3000 tons at this price.

Steel.—The Steel mills are filled up with tonnage and owing to shortage of metal at some of the principal plants are considerably behind in deliveries of both Billets and Bars. We note sales of Sheet Bars in long lengths as high as \$25.50, Pittsburgh, and quote the market at \$25 and \$25.50. Bessemer and Open Hearth Billets, ordinary carbon, bring \$23 and upward for prompt shipment. Forging Billets, running 0.60 and higher in carbon, bring \$25 a ton, and in some cases higher prices for spot delivery.

(By Mail.)

The Iron trade at the present time is in a condition without parallel in the fact that more Pig Iron, more Steel and more Coke is being made in this country at the present time than ever before in the history of the trade, and statistics printed last week show conclusively that the tremendous output of Pig Iron, Steel and Coke that is being made is going into actual consumption. At this time the United States is producing Pig Iron at the rate of nearly 21,000,000 tons per annum, every Steel plant that can be operated is running to full capacity, and more Coke ovens are in blast and more Coke is being made than ever before in the history of the trade. This unusual condition in raw material is reflected in nearly all lines of Finished Iron and Steels, the demand for which is unusually heavy for this season of the year. If present conditions can be maintained throughout 1905 the Iron trade will have cause for congratulation, as it will mean the heaviest tonnage ever produced and at prices that are bound to show very satisfactory profits. The efforts of the large interests are being concentrated now to hold the trade about on the present basis as regards prices, particularly of Pig Iron and Steel, the desire being to ward off any boom that might come and which is inevitably followed by a reaction. The general conditions of the country are good

and the feeling is growing that 1905 will be one of the best years in every way the Iron trade has ever known.

The principal transaction during the week was the sale by W. P. Snyder & Co. of this city of 25,000 tons of Bessemer Pig Iron to the Steel Corporation at the same price as the December Iron—that is, on the basis of \$15.50, Valley furnace. The Bessemer Pig Iron Association furnaces are well sold up, having very little Iron to spare for January shipment, and for this reason declined to take part of this tonnage at the price. It is practically certain that the Steel Corporation will need February Iron, as the Carnegie Steel Company is very short of metal at nearly all of its plants. At the Ohio Works of the Carnegie company at Youngstown about 2200 tons of Iron are being melted daily, and on Saturday of last week this plant had less than 1000 tons of Iron in stock. It is probable that one or two other leading Steel companies will need Bessemer and Basic Iron before long, as they have a tremendous tonnage of Finished Material on their books and their blast furnaces are unable to turn out enough Iron to meet their melting capacity, which is being pushed to the utmost. The Steel Corporation is operating at the present time 94 per cent. of its blast furnaces. The absolute minimum of the market on Bessemer Pig is \$15.50, Valley furnace, and this price would only be made to leading interests like the Steel Corporation that buy in very large lots and for actual needs. The general market on Bessemer and Basic Pig for ordinary tonnage is \$15.75 to \$16, Valley furnace, most producers holding their Iron for the latter figure. Some fair sized inquiries are in the market for Foundry Pig, one local consumer having bought this week 1500 to 2000 tons on the basis of about \$16 for Northern No. 2. There have also been some fair sized sales of Forge Pig, probably about 5000 tons in all, at \$15.40, Valley furnace, or \$16.25, Pittsburgh.

The Steel market continues very active in demand and all the mills are more or less behind in deliveries. Bessemer and Open Hearth Billets of ordinary carbons readily bring \$23 or more, while Forging Billets of high carbon bring \$25 and upward. Sheet and Tin Bars in long lengths are quoted at \$24 to \$25, at maker's mill, for reasonably prompt delivery.

The tonnage in Finished Iron and Steel is holding up remarkably well, considering that this is always the dullest season of the year. It is true that new tonnage is not as large now as in December, but this is due to the fact that most leading consumers covered their requirements pretty far ahead and before the advances in prices were made last month. The Steel Bar makers met in this city yesterday and reaffirmed the price of 1.40c., Pittsburgh, for Bessemer and Open Hearth Steel Bars in carloads and larger lots.

Ferromanganese.—Prices are very firm, and we quote English and domestic 80 per cent. at \$45, delivered, in carloads and larger lots.

Rods.—The demand is fairly active, and prices are firm on the basis of \$31 to \$31.50, Pittsburgh, for Bessemer and Open Hearth.

Skelp.—Prices have again sharply advanced, and some heavy sales have been made in the past week or two. A local interest has taken a contract for about 6000 tons of Grooved and Sheared Iron Skelp, and some heavy sales have been made by Eastern mills. All the Skelp makers are well sold up for the next several months, and are very firm in their ideas as to prices. We have advanced prices about \$3 a ton and now quote: Grooved Iron Skelp, 1.80c. to 1.85c.; Sheared, 1.90c. to 1.95c.; Grooved Steel Skelp, 1.55c. to 1.60c., and Sheared, 1.60c. to 1.65c. These prices apply on ordinary widths and gauges, f.o.b. cars, maker's mill, terms 30 days, less 2 per cent. for cash in 10 days.

Muck Bar.—The market is very firm, but new demand is rather quiet. We quote best grades of Muck Bar made from all Pig Iron at \$28.50 to \$29, Pittsburgh.

Steel Rails.—No large contracts have been placed in the past week. We quote Standard Sections at \$28, at mill. Light Rails are very firm, but the demand is not so active. We quote these at \$23.50 to \$26, depending on weight.

Structural Material.—No important contracts have been placed in the past week and no large jobs are in sight in this district. This is always the dullest season of the year in the Structural trade and the present quiet condition is no exception. We quote: Beams and Channels, up to 15-inch, 1.50c.; over 15-inch, 1.60c.; Angles, 3 x 2 x 1/4 inch thick up to 6 x 6 inches, 1.50c.; Angles, 8 x 8 and 7 x 3 1/2 inches, 1.60c.; Zees, 3-inch and larger, 1.50c.; Tees, 3-inch and larger, 1.55c. Under the Steel Bar Card Angles, Channels and Tees under 3-inch are 1.50c., base, for Bessemer, and 1.55c., base, for Open Hearth, subject to half extras on the Standard Steel Bar Card.

Plates.—Conditions in the Plate trade present nothing new, demand being rather quiet, as it usually is at this season of the year. The mills are fairly well filled with tonnage and specifications on large contracts placed before the recent advance in prices are coming in very satisfactorily. It is said that official prices are being firmly held. We quote: Tank Plate, 1/4 inch thick, 6 1/4 to 14 inches wide, 1.40c., base; over 14 inches wide and up to 100 inches in

width, 1.50c., base, at mill, Pittsburgh. Extras over the above prices are as follows:

	Extra per 100 pounds.
Gauges lighter than $\frac{1}{4}$ -inch to and including 3-16 inch Plates on thin edges.	\$.10
Gauges No. 7 and No. 8.	.15
Gauge No. 9.	.25
Plates over 100 to 110 inches.	.05
Plates over 110 to 115 inches.	.10
Plates over 115 to 120 inches.	.15
Plates over 120 to 125 inches.	.25
Plates over 125 to 130 inches.	.50
Plates over 130 inches.	1.00
All sketched (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches).	.10
Complete Circles.	.20
Boiler and Flange Steel Plates.	.10
Marine, "A. B. M. A." and ordinary Fire Box Steel Plates.	.20
Still Bottom Steel.	.30
Locomotive Fire Box Steel.	.50
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum, and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of $\frac{1}{4}$ of 1 per cent. is allowable. Pacific Coast not included.

Sheets.—The demand has not been quite as active this month as in December, but this is due to the fact that leading consumers placed heavy orders last month in anticipation of the advance in prices, and the mills are now running on specifications on these contracts. There is still trouble in getting prompt deliveries of Sheet Bars, and this has a tendency to stiffen the market. The leading Sheet mills have their tonnage pretty well engaged for the next several months. There is no change in prices and we quote: No. 24, box annealed, one pass through cold rolls, 2.05c.; No. 26, 2.15c.; No. 27, 2.20c., and No. 28, 2.30c. We quote Galvanized Sheets as follows: Nos. 22 and 24, 2.75c.; Nos. 25 and 26, 2.95c.; No. 27, 3.13c.; No. 28, 3.35c. We quote No. 28 Gauge Painted Roofing Sheets at \$1.65 per square, and Galvanized Roofing Sheets, No. 28 Gauge, at \$2.85 for $2\frac{1}{2}$ -inch corrugation. Jobbers charge the usual advances over above prices for small lots from store.

Iron and Steel Bars.—A meeting of the Steel Bar Association was held in Pittsburgh on Monday, the 16th, at which the price of 1.40c. for Bessemer and Open Hearth Bars was reaffirmed. New tonnage is lighter than for some time, both in Iron and Steel Bars, but this is for the reason that leading consumers bought heavily early in December before the advance in prices was made, and specifications on these contracts are coming in very satisfactorily. Some of the leading Bar mills report they are from three to four weeks behind in orders. We quote Iron Bars at 1.65c., Youngstown, or 1.69 $\frac{1}{4}$ c., Pittsburgh. We quote Bessemer and Open Hearth Steel Bars at 1.40c., base, for carload lots, with the usual advances for small lots.

Hoops and Bands.—The tonnage in both Hoops and Bands is rather quiet, but prices are fairly firm. We quote Steel Hoops at 1.55c. and Steel Bands at 1.40c., base, extras as per Steel Card, maker's mill.

Tin Plate.—The Tin Plate trade continues active, the leading mills having all the tonnage on their books that they can take care of for the next three or four months. A good part of this tonnage was taken before the recent advance of 10c. a box in prices and consumers are now specifying on these contracts. We quote 100-lb. Cokes at \$3.50 net, f.o.b. Pittsburgh, terms 30 days, or 2 per cent. off for cash in 10 days.

Merchant Pipe.—Conditions in the Pipe trade are very satisfactory and a very heavy tonnage has been placed with the leading mills, particularly in Line Pipe, during the past two weeks. The market is exceedingly firm and some in the trade believe that prices will again be advanced before long. Discounts to consumers in carloads are as follows:

Merchant Pipe.		Steel.		Iron.	
		Black.	Galv.	Black.	Galv.
		Per cent.	Per cent.	Per cent.	Per cent.
$\frac{1}{8}$ and $\frac{1}{4}$ inch.		.68 $\frac{1}{2}$	52 $\frac{1}{2}$	66 $\frac{1}{2}$	50 $\frac{1}{2}$
$\frac{3}{8}$ and $\frac{1}{2}$ inch.		.72 $\frac{1}{2}$	60 $\frac{1}{2}$	70 $\frac{1}{2}$	58 $\frac{1}{2}$
$\frac{3}{4}$ to 6 inches.		.76 $\frac{1}{2}$	66 $\frac{1}{2}$	75	65
7 to 12 inches.		.71 $\frac{1}{2}$	56 $\frac{1}{2}$	70	54 $\frac{1}{2}$
Extra strong, plain ends,					
$\frac{1}{8}$ to $\frac{1}{4}$ inch.		.61 $\frac{1}{2}$	40 $\frac{1}{2}$	50 $\frac{1}{2}$	47 $\frac{1}{2}$
$\frac{1}{2}$ to 4 inches.		.68 $\frac{1}{2}$	56 $\frac{1}{2}$	66 $\frac{1}{2}$	54 $\frac{1}{2}$
4 $\frac{1}{2}$ to 8 inches.		.64 $\frac{1}{2}$	52 $\frac{1}{2}$	62 $\frac{1}{2}$	50 $\frac{1}{2}$
Double extra strong, plain ends, $\frac{1}{8}$ to 8 inches.		.57 $\frac{1}{2}$	46 $\frac{1}{2}$	55 $\frac{1}{2}$	44 $\frac{1}{2}$

Boiler Tubes.—A fair amount of tonnage is being placed and the mills are pretty well filled up. Discounts on carload lots are as follows:

Boiler Tubes.		
	Iron.	Steel.
1 to 1 $\frac{1}{2}$ inches.	45	48
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ inches.	45	60
2 $\frac{1}{2}$ inches.	50	62
2 $\frac{1}{2}$ to 5 inches.	57 $\frac{1}{2}$	68
6 to 13 inches.	45	60

Merchant Steel.—New tonnage is rather light, but the mills are pretty well filled up on old contracts, on which buyers are specifying quite freely. The demand for Shafting is very active, most of the mills being sold up for several

months. We quote: Tire Steel, 1.60c. to 1.65c.; Smooth Finished Machinery Steel, 1.60c.; Open Hearth Spring Steel, 2c. to 2.10c.; Toe Calk, 1.90c. to 2c.; Cold Rolled Shafting is 52 per cent. off in carloads and 47 per cent. in less than carloads, delivered in base territory.

Railroad Spikes.—The demand is very active, and one of the local makers is practically out of the market as a seller. We quote \$1.65 to \$1.70 in carloads per 100 lbs. and \$1.75 in less than carloads.

Spelter.—The market is very firm, and Prime grades of Western are held at 6.15c. to 6.20c., St. Louis, equal to 6.27 $\frac{1}{2}$ c. and 6.32 $\frac{1}{2}$ c., Pittsburgh. The leading producers are well sold up, and still higher prices are freely predicted.

Connellsville Coke.—Never before in the history of the Coke trade have as many ovens been in blast in the Coke regions as at the present time. Out of 22,711 ovens in the Connellsville region proper only 1700 were idle last week, and most of these are not in shape to make Coke, being in need of repairs or else shut down because the Coal is exhausted. Cars are not as plentiful as the operators would desire, the Pennsylvania Railroad being in particularly bad shape. The Pittsburgh & Lake Erie and the Baltimore & Ohio roads are furnishing a normal quota of cars, and were it not for this fact the situation in the region regarding car supply would be much worse than it is. Very high prices continue to be paid for Furnace Coke for prompt delivery, this readily bringing \$2.75 to \$3 a ton at oven. It is claimed that contracts for Connellsville Furnace Coke have been made for second half of the year at \$2.50 a ton at oven. In the Lower Connellsville region there are 6408 ovens, of which 6009 were active last week, and only 399 idle. The total output of the Upper and Lower Connellsville regions last week was about 290,000 tons, an increase over the previous week of about 5000 tons. We quote Best Connellsville Furnace Coke for prompt shipment at \$2.75 to \$3 a ton at oven, while on contracts \$2.50 is quoted. Connellsville 72-hour Foundry Coke readily brings \$2.50 up to \$2.65 a ton on contracts. The Coke trade, as a whole, is in more prosperous condition, both as regards output and prices than ever before.

Iron and Steel Scrap.—The market on Old Material is exceedingly quiet, a waiting game being played between buyers and sellers, with neither side inclined to give way. However, prices on Scrap seem to be slightly easier and for some lines have gone off about 50c. a ton. Dealers who have Scrap piled up are disposed to hold it, believing that the market will recover all its lost ground and more just as soon as demand improves. We quote: Heavy Melting Stock, \$16 to \$16.50; No. 1 Wrought Scrap, \$17 to \$17.50; Cast Iron Borings, \$10.75 to \$11; Busheling Scrap, \$15 to \$15.25; Wrought Iron Turnings, \$13.50 to \$14; Steel Rails, short pieces, \$16 to \$16.50; Iron Car Axles, \$23 to \$24; Steel Car Axles, \$19.50 to \$20, in gross tons.

Foster & Green., dealers in Iron and Steel, Farmers' Bank Building, Pittsburgh, Pa., will hereafter represent the United States Reduction Company, Chicago, in the Pittsburgh district in the sale of metal specialties, including Dies, Tools, Models, Experimental Brass and Aluminum Castings, also Babbitt Metal, Solder, Aluminum, Ingots and Advance Anti-Friction Babbitt Metal.

Cleveland.

CLEVELAND, OHIO, January 17, 1905.

Iron Ore.—The labor situation on the lakes has come to be the biggest factor in the lake Ore trade. The Lake Carriers' Association at its meeting last week decided to demand open shop on the lakes next year, insisting that the vessel owners make contracts with their employees as such rather than through the unions. The aggressiveness of unionism has been nowhere more pronounced than on the lakes. In the season just closed, for the first time in years, every branch of labor on shipboard was governed by the unions. Vesselmen complained that with their low rates of carriage, the slack business and the overplus of tonnage they were not able to pay the high wages demanded by the unions, and it was generally expected that some stand would be taken at the beginning of this year which would try issues with the unions. Now that the stand has been taken the possibility of defeat or success for either side is being calculated. In this the amount of Ore on hand available for immediate use plays a considerable part. It is figured that with the amount of Ore on the furnace stock piles there will be little, if any, necessity to draw on the supply on the lake docks before March 1. The statistics show that the lake docks now contain upward of 5,500,000 tons. It is known that the melt now is extremely heavy and orders on hand at the furnaces do not indicate any abatement in activity there for several months to come. The present speed of melt being continued, many of the furnace men believe the supply will have been exhausted before July 1. The season of navigation normally opens between April 1 and

April 15. The lake labor organizations have announced that they will not submit to the open shop idea without a struggle. The situation in the Ore trade, if the forecasts of the furnace owners prove to be correct, will dictate that if such a struggle is to be waged it must be short and decisive if the productive capacity of the furnaces is not to be hindered by a shortage of Ore. The early need for Ore, however, is the only thing that would prevent the vessel owners from entering a long struggle with the unions. The lake tonnage is enormous and is being increased this winter by the addition of several ships with large carrying capacity. In addition docks are being equipped with fast unloading plants and the railroads have increased their equipment. These things make it possible to ship a large amount of Ore during a season, with a commensurate amount of other materials. In addition it is now computed by the Ore men that the production of Ore during the coming season is not likely to exceed 25,000,000 tons. If the furnaces are not hampered at the beginning by a lack of Ore the vessels may be in position to put up a protracted fight and still move during the season a large amount of material and get higher rates for the movement as a result of the short season. The prospect looks inviting, hence the vesselmen have decided to fight.

Pig Iron.—Trade has been rather quiet. There have been some few small sales of Southern Iron in this territory of late. The Southern furnaces hold for \$13.50 to \$14, Birmingham, for No. 2, which, with \$3.85 freight rate added, about brings Northern and Southern Irons on an equality in the Cleveland market, with Northern No. 2 Foundry quoted at \$16.50 to \$17 in the Valleys. The Coke situation is strong. The best 72-hour Foundry Coke is selling at \$3.25 at the oven, and good Furnace Coke is bringing \$3 at the oven.

Finished Iron and Steel.—Billets are selling at a premium, with some of the mills inclined to refuse to take any more orders for a while. One company announces that it will not be able to make deliveries inside of four months, while some specifications are not promised inside of five months. With all of the mills it is a question of deliveries. The only spot material available is that out of stock. Prices range, according to the size and the grade wanted, from \$25 to \$30, Cleveland, for either Bessemer or Open Hearth, while the forging qualities are sold at about the same range of prices, with the usual additions for carbons. In Plates and Shapes some few contracts are coming in, but for the most part buyers in this territory have covered their needs for the present. Specifications are heavy. There is very little demand for Standard Rails. Light Rails, however, are in good demand. Sizes from 25 to 40 lbs. are selling at about \$24, while some of the lighter weights range from that to \$30, Pittsburgh. The Bar trade is steady, with Bar Iron quoted at 1.65c. to 1.70c., Youngstown, and Bessemer and Open Hearth Steel quoted at 1.40c., Pittsburgh. The recent advance in the price of Sheets did not lessen the buying, and, in fact, consumers seem to be taking material without regard to the price for it. Base quotations are 2.50c. for Nos. 22 to 24 Black Sheets out of stock, with the same gauge, one pass cold rolled, selling at 2.20c. in car lots at the mills.

Old Material.—The market has been steady. Prices are strong, but they have not changed during the week in a way to affect the general market, although some small sales have been made at slightly higher prices. We continue to quote, all gross tons: Old Steel Rails, \$16 to \$16.50; Old Iron Rails, \$25; Old Car Wheels, \$17; Heavy Melting Steel, \$16 to \$17. All net tons: Cast Borings, \$8; No. 1 Busheling, \$15; No. 1 Railroad Wrought, \$19 to \$20; Iron Car Axles (nominal), \$20 to \$21; No. 1 Cast, \$14.50; Stove Plate, \$11 to \$12; Iron and Steel Turnings and Drillings, \$12.50 to \$13.

The New York Pig Iron Warrant Market.

The Pig Iron warrant certificate market the past week opened rather quiet, but gradually developed strength as more disposition to trade was shown. The greatest activity for some days manifested itself on Wednesday morning, when transactions were made covering 800 tons. On the whole the demand was fairly good, the sales aggregating 1700 tons, an increase of 500 tons over those of the previous week, but the prices obtained were considerably lower. The sales as reported on the New York Produce Exchange were: January, 300 tons, \$16.90; February, 200 tons, \$17, 100 tons, \$16.90, and 100 tons, \$16.80; March, 100 tons, \$17, 100 tons, \$16.90, and 100 tons, \$16.80; April, 500 tons, \$16.80; May, 100 tons, \$16.90, and 100 tons, \$16.75. The quotations established on call, Wednesday noon, are as follows:

	Bid.	Asked.
Cash	\$16.50	.....
January	16.80	.....
February	16.80	\$16.85
March	16.75	16.90
April	16.80	17.00
May	16.70	16.75
June	16.60	16.75
July	16.50	16.70

The Machinery Trade.

NEW YORK, January 18, 1905.

Machine Tool Builders in Conference.

Two important meetings, or rather conferences, of machine tool builders were held in New York yesterday. They were both for the purpose of further strengthening the National Machine Tool Builders' Association. This organization as now composed is rather weak in one branch of the trade and one of the main objects of the gathering in New York yesterday was to correct this. This branch of the trade is the one producing boring mills. At the invitation of the Executive Committee of the National Machine Tool Builders' Association representatives of seven leading builders of boring mills gathered at the Hoffman House, and after President Lodge explained some of the benefits derived from the association by the lathe builders and producers of other classes of machine tools, the boring mill men went off into executive session and discussed the matter of coming together and joining the National Association. Mr. Lodge presented many very convincing arguments showing how certain features of the lathe business, for instance, which had for years proved very vexatious, had been entirely eliminated from the business through the efforts of the Machine Tool Builders' Association. He told of the standardization of certain dimensions of the milling machine which had been agreed upon as a result of the association. He also referred at length to the adoption of uniform prices of extra lengths of lathe beds and attachments, &c. These points all appealed to the boring mill makers, for they now have many similar problems before them. These problems were freely discussed by the boring mill men, involving such points as the center boring head, the electric motor drive, the amount of swing and the amount to be taken under the tools. The conference terminated, just as did all of those preceding the organization of the National Association, with the men who had been the keenest sort of competitors and had never been able to get together before, all agreeing that they were not such a bad lot after all and might really gain something by living together not only in peace and harmony, but with some degree of unity as well. The outcome of the meeting was that Clarence J. Wetsel, treasurer of the Baush Machine Tool Company, was appointed to enter into correspondence with all of the boring mill builders and the executive officers of the National Association with a view of bringing the "outsiders" into the fold. Boring mill builders who attended the conference agreed that it was highly successful, and one of the prominent manufacturers stated that it is probable that the National Machine Tool Builders' Association will be augmented by the addition of the principal boring mill producers of the country. Those present at the conference were Mr. Poole of the J. Morton Poole Company, Wilmington, Del.; Dudley B. Bullard of the Bullard Machine Tool Company, Bridgeport, Conn.; Mr. Colburn of the Colburn Machine Tool Company, Franklin, Pa.; Mr. Johnston of the Gisholt Machine Tool Company, Madison, Wis.; Mr. Mueller of the King Machine Tool Company, Cincinnati, Ohio; Mr. Wetsel of the Baush Machine Tool Company, Springfield, Mass., and D. H. Rogers of the Rogers Machine Tool Company, Alfred, N. Y. Word was received from the Betts Machine Tool Company of Wilmington, Del., that Mr. Betts was prevented from being present through illness.

While the conference of boring mill makers was in progress the Executive Committee of the National Machine Tool Builders' Association was in session. Those present were: William Lodge of the Lodge & Shipley Machine Tool Company, Cincinnati; President W. P. Davis of the W. P. Davis Machine Company, Rochester, N. Y.; F. E. Reed of the F. E. Reed Company, Worcester, Mass.; Enoch Earle of P. Blaisdell & Co., Worcester, Mass., and P. E. Montanus of the Springfield Machine Tool Company, Springfield, Ohio, secretary. The subject which received the greatest consideration was that of strengthening the association so that it would present a solid front representing the entire machine tool industry of this country. One of the chief objects of this is the benefit which would be derived in influencing legislation in Washington. It is the object of the association to have considerable to say when the matter of tariff revision comes up, as it doubtless will in the very near

future. At the last meeting of the association, it will be recalled, a resolution was passed providing that the association take definite steps to bring about any measures providing such revision or modification of tariffs as may eventually lead to better trade conditions obtaining between this country and foreign countries, and particularly France, Russia and Canada, which have tariffs prejudicial to the importation of American machine tools. A committee, composed of Messrs. Fifield, Geier, Montanus, Reed, Hoeffinghoff and Woodward, appointed to look into the matter and report to the Executive Committee their findings, together with the decision reached by the Executive Committee yesterday, will outline a plan of action to be approved by the association at its next meeting.

It was decided to hold the next meeting of the association at Washington, D. C., beginning April 11.

Another subject dealt with by the committee was that of electric drives. At the last meeting of the association a committee, consisting of Messrs. Woodward, Lodge, Geier, March, Tuechter, Binsse and Wetsel, was appointed to confer with manufacturers of electric motors with a view of agreeing upon certain standard dimensions and report at the next meeting of the association. The Executive Committee discussed the findings of this committee preliminary to turning them over to the motor manufacturers. President Lodge stated that among other things the association will endeavor to secure slower speed motors, as at present they are operated at a speed considerably higher than will permit the smooth running of transmission gears.

The Executive Committee of the Southern Supply & Machinery Dealers' Association held a meeting at the New St. Charles Hotel, New Orleans, La., on January 16 and 17. The association includes in its membership many of the important machinery concerns in the South and has compiled a list of the officers, standing committees and active and honorary members.

American Machinery in European Exhibition.

T. H. Marburg, American representative of Alfred H. Schütte of Cologne, Germany, the large importer of American machine tools, who as told in our issue of last week has succeeded to the entire business of Schuchardt & Schütte in Western Continental Europe, has just returned from a Western trip, during which he visited the many machine tool builders represented abroad by Mr. Schütte. The chief object of his visit was to select tools and arrange for their shipment to Belgium, where they are to be exhibited at the International Exhibition to be held in the spring at Liège. In speaking of the exhibition Mr. Marburg said: "The house of Alfred H. Schütte has reserved for its large American business connections 45 per cent. of the space allotted to the United States at the exhibition, which opens April 30, 1905. There has never been such a complete exhibit of American machine tools anywhere, not even at St. Louis last year, as will be shown at Liège this summer. The machinery will be exhibited in operation to a great extent. There can be no doubt that the returns in the shape of orders from Europe will handsomely repay the expense involved. Arrangements for shipping the exhibits are now under way."

A New Factor in the Heavy Machine Tool Trade.

It is interesting to note that the first machine produced by the Ridgway Machine Tool Company, Ridgway, Pa., has been finished and is ready for shipment. This marks the entering into the trade of a new factor, a new producer of heavy machine tools. The tool, which is about to be shipped, is a fine big boring mill. It is of extra heavy construction and its proportions are such as to give it extreme rigidity. It will have a capacity of 10 x 16 feet and is about 20,000 pounds heavier than the average machine of that size. It is equipped with an extension boring head of new design and includes a number of other improvements, among which are rapid traverse movement to the boring bars and saddles, on the extension boring head as well as on the machine proper; independent feeds and power movement are provided for all of the moving parts on the cross rail, and all of the gearing, including the internal table gear, is made of cast steel.

The machine was purchased by the Bucyrus Company of South Milwaukee, Wis., and will be used for turning up parts of heavy machinery which the Bucyrus Company is building for work on the Panama Canal. The Ridgway Company will, in addition to boring mills, build planers, radial drills and all types of machine tools in extra heavy sizes. Naturally on such heavy types of tools the problem of electric motor drive enters very largely. In view of work which has already been done by the company in this direction at its own plant some very interesting developments are looked forward to by the trade along the lines of novel electric drives on the tools produced at Ridgway.

Large Prospective Machinery Orders.

While no specifications of the machinery to be included in the "1905 tool appropriation" of the Pennsylvania Railroad have been received in the trade as yet, there is a well founded rumor afloat to the effect that this list is now completed, and is in the hands of the officers of the company for final approval. It is stated that it represents tools of more than \$600,000 in value, including all classes of shop

tools. Most of the tools, it is said, will be used in the Altoona and nearby shops. The purchases for the Trenton and Olean shops have been concluded.

It is now reported that the Bethlehem Steel Corporation will spend more than \$5,000,000 enlarging its plant at Bethlehem this year. The detailed plan of improvement, it is said, will be outlined at the adjourned meeting of the stockholders, to be held in Philadelphia on January 29. It is expected that Charles M. Schwab will outline the plan personally. The reports in the trade have it that it is intended to enter into the manufacture of crucible steel, high grade castings and steel springs, as well as increasing the capacity for producing guns and armament. This will necessitate the erection of blast furnaces, as well as the construction of great mills and shops.

The New York Central & Hudson River Railroad has placed some good sized machinery orders during the week, including principally a large lathe order, placed with a Liberty street house.

The Dominion Iron & Steel Company, North Sydney, C. B., has just placed an order with Manning, Maxwell & Moore, selling agents for the Shaw Electric Crane Company, Muskegon, Mich., for a 75-ton special steel casting ladle crane. It will be of 60 feet span, and will have a 25-ton auxiliary hoist. It is to be installed in the main open hearth department of the plant.

The Waterbury Electric Company, Incorporated, of Waterbury, Conn., is about to place orders for a considerable amount of the smaller sizes of machine tools and automatic machinery. The company, we understand, has arranged to occupy the three-story building vacated by the E. J. Manville Machine Company, which has moved to a new location. The company manufactures thermostats, heating and furnace regulators, &c.

While little has been heard of late of purchases of American machinery by the Japanese Government, it is apparent that its agents are still placing some nice orders with merchants in this country. The Atlas Engine Works, Indianapolis, Ind., by cable correspondence covering two days, recently booked what is said to be one of the largest orders for water tube boilers that has been placed abroad by American manufacturers for many years. The order was for the account of its agent at Yokohama, Japan, F. W. Horne, and was for six batteries of the largest units made by the company. The inference is that the boilers are for the Japanese Government, but whether to be used in mining or manufacturing or to rehabilitate the Russian war ships captured in the harbor of Port Arthur is a matter on which the company received no information. Each boiler purifies its own feed water and superheats its own steam, making it peculiarly adaptable in an emergency by obviating the necessity for auxiliary apparatus.

The Sewerage and Water Board of New Orleans, La., 602 Carondelet street, announces that at an early date it will readvertise for bids for the water works pumping machinery, upon which bids were received on November 9, 1904, all bids at that time having been rejected on account of a technicality urged by the attorney of the Holly Mfg. Company, to the effect that the Sewerage and Water Board had not passed a formal resolution of approval of the specifications prior to the letting. An item mentioning this equipment in detail was published in *The Iron Age* for September 22, 1904, page 40. The original specifications called for: Four 20,000,000-gallon pumping engines, to work against a 218-foot head; three 40,000,000-gallon centrifugal pumps, to work against a 25-foot head; three engines to operate these centrifugal pumps; two 150-kw. 550-volt direct current generators; two engines to drive these generators; six 400 horse-power water tube boilers; also all steam and water pipe connections and other appurtenances complete for operation within and connecting the boiler and pump house buildings. F. S. Shields is secretary of the board.

The S. R. White Mfg. Company, Bloomington, Ill., is forming a syndicate for the purpose of installing in that city a central heating, light and power plant. The purpose of the company is to buy mine run coal, screen it, sell the merchantable coal and to utilize the screenings to furnish power for this plant, the fine coal to be fed into the furnace by some suitable mechanical device. Samuel R. White, the president of the company, is interested in receiving information from buyers of such equipment as he will require. It is estimated that the plant will ultimately require 1000 horsepower in boilers.

The Western Engineering & Construction Company, Chicago, will shortly purchase for the Kalamazoo, Benton Harbor and South Haven extension of the Kalamazoo & Lake Shore Traction Company between 3000 and 4000 kw. in generators. A power house will also be built for this equipment to operate the 80 miles of extension.

Frank S. Betz & Co., manufacturers of surgical instruments, Chicago, are erecting at Hammond, Ind., a manufacturing plant consisting of the following buildings: Forge shop, 100 x 200 feet; machine shop, 100 x 200 feet; enameling room, 40 x 60 feet; power plant, 60 x 60 feet; storehouse, 100 x 100 feet; stockroom, 60 x 100 feet; shipping room, 90 x 136 feet; general office, 60 x 136 feet; drug de-

partment, 100 x 100 feet; exhibit room, 30 x 100 feet. The total ground area of all the buildings of the plant is over 100,000 square feet. This group of buildings is under three roofs, the overall dimensions of the largest structure being 100 x 536 feet, the next 100 x 260 feet and the third 100 x 100 feet. The engineering and construction work is in the hands of Adams & Schwab, Railway Exchange Building. The plant will cost about \$500,000.

The Ariel Motor Car Company, 70 Stanhope street, Boston, is looking for factory facilities near Boston on one of the trunk lines. The company will be in the market for machine tools and requests catalogues. The company is controlled by the Lewis & Matthews Company, Boston.

The George Cutter Company, maker of electric light specialties, Union and Fulton streets, Chicago, is erecting a new factory at South Bend, Ind., which will be 80 x 200 feet. Electric power is to be employed. The company will be in the market for metal working machinery April 1.

Business Changes.

The Cincinnati Planer Company of Cincinnati, Ohio, has increased its capital stock to \$200,000, and elected the following officers: C. H. M. Atkins, president; B. B. Quillen, secretary and treasurer; Geo. Langen, general superintendent; these officers together with E. N. Atkins and C. M. Quillen make up the directory. W. H. Burtner, former president of the company, retires on account of poor health. Mr. Atkins, the new president, is also president of the Warner Elevator Company and the Norwood National Bank, and is connected with several other leading concerns of Cincinnati.

The F. N. Wedge Hoisting & Conveying Machinery Company, Cleveland, Ohio, has been incorporated by F. N. Wedge, F. H. Ewing, S. D. Wright, F. J. McManus and Frank W. Scott. The company is preparing to erect a plant in Cleveland for the production of hoisting and conveying machinery, the invention of F. N. Wedge, who was formerly with the Griffith & Wedge Machinery Company, Zanesville, Ohio. The Wedge conveyor is arranged so that a number of buckets are in use at one time. The capitalization of the company is \$20,000, but this will be increased later.

The Alton Pneumatic Tool Company, Fostoria, Ohio, has been incorporated with \$100,000 capital stock by M. M. Carr, E. W. Allen, M. A. Thomas, Fred C. Wein and J. D. Hare. The company will manufacture pneumatic hammers, riveters, chisels, calkers, &c. New machinery will be installed in the building occupied by the Atlas Safe Company, and work on the production of the tools will be started within 60 days.

The Electric Controller & Supply Company, Cleveland, Ohio, has placed Geo. Magalhaes in charge of its Eastern office at 136 Liberty street, New York. Mr. Magalhaes is a graduate of Columbia University and has been connected with the engineering department of the company for some time. He is thoroughly familiar with the company's products, chief of which are reversing controllers, solenoids, lifting magnets, magnetic switch controllers for reversing or nonreversing motors driving heavy machinery, direct connected variable speed motor drive for planers, &c. The company has advised its Eastern customers to address the New York office direct.

The Seymour R. Church Company of San Francisco, Cal., having by mutual consent of its members agreed to dissolve, will be succeeded by a copartnership formed under the name of Schmidt & Faure, to act as general merchandise brokers and dealers in all kinds of foundry supplies, plumbago and sea coal facings. The headquarters of the new firm are at 220 Market street, San Francisco.

The Savannah Trust Company, Savannah, Ga., invites bids for the purchase of the plant and real estate of the Georgia Car & Mfg. Company, bankrupt, located on the Coast Line and Seaboard Railways about four miles from the city of Savannah. The property consists of about 81 acres of land and a complete plant for the building of freight cars. The property will be sold as a whole and bids will be received at the trustee's office in the city of Savannah on or before the first day of February next, on which date the bids will be opened and submitted to the Referee in Bankruptcy.

Government Purchases.

Changes in Navy Department Contracting Methods.

WASHINGTON, D. C., January 17, 1905.—The Navy Department has decided to make an important innovation in the present method of advertising for proposals, opening bids and awarding contracts for supplies of all kinds. The effect of the change will be to concentrate in Washington all transactions involving purchases of any considerable size, while to the naval pay offices will be assigned the letting of contracts for small items, usually of an emergency character, the limited value of which usually deters all but local concerns from bidding thereon. The change is practically a return to the methods in force up to a few months ago and is made because of the impossibility of continuing the present methods without a large increase in the clerical force of the Navy Department.

The system of receiving proposals and letting contracts, in force for many years in the Bureau of Supplies and Accounts in the Navy Department, was modified a few months ago as the result of a decision of the Comptroller to the effect that the laws prohibit open market purchases except in cases of actual emergency, and that all naval supplies not coming within this exception must be bought under formal contract after due advertisement for bids. At that time small lots of material, not strictly of an emergency character, were usually purchased for the various navy yards and naval stations by the local naval pay offices. The only bidders usually were local concerns, the value of the goods advertised not being sufficient to justify other firms in competing. The Comptroller's decision was so sweeping in its terms, however, that the Postmaster-General decided to transfer from the various offices to Washington the work of buying all these supplies, and for several months past the Bureau of Supplies and Accounts has struggled along with the herculean task. The weekly issues of proposal blanks have included several hundred items ranging in value from \$2.50 to \$75,000, and on one occasion 435 bids were received, the opening of proposals occupying two days and employing a large staff of clerks until after midnight.

Under these conditions the Comptroller has again been appealed to and has just decided that the local purchases formerly made through the naval pay offices may hereafter be made through such offices without newspaper advertisement, the intent of the law being met if the notification of local firms is secured through notices sent out by mail and posted on bulletin boards. He still holds, however, that contracts must be made for all such purchases and the Department will therefore provide a simple form involving as little red tape as possible.

Hereafter, therefore, small lots of material required on short notice by the various yards and stations will be purchased by the local naval pay offices without newspaper advertisement but after as much publicity as it is possible otherwise to secure, while the Bureau of Supplies and Accounts will return to its former practice of advertising for all important purchases, opening bids and letting contracts therefor at Washington. The modified practice will go into force in about a fortnight, as soon as pending requisitions have been disposed of.

W. L. C.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until February 14 for a quantity of supplies for the Mare Island and Puget Sound navy yards, including drills, reamers, metal slitting and angle cutters, pumps, &c.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until February 7 for the following machine tools for the Portsmouth, Boston, New York, League Island, Norfolk and Pensacola navy yards: Schedule 44, surface planer, tool grinder, emery wheel grinder, wood trimmer, tenoning machine, drill, engine lathe, dredging pump, locomotive boiler, self oiling engine, swinging engine, water heater; schedule 45, engine lathe, speed lathe, metal planer, milling machine, shaper, drills grinders; schedule 46, motor drive outfit for various machine tools, planer, key seating machine, drill, engine lathe, turret lathe, sprue saw, pipe cutting machine, grinder, hoisting engines, oil fired heating furnace, mining pump, electric launch equipment, dust collecting systems; schedule 47, pipe cutting machine, pipe expanding machine, pipe bender, hydraulic furnace jack, straightening press, bushing press and hydraulic accumulator.

The Isthmian Canal Commission, Washington, will receive bids until February 7 for steam hammers, planers, drills, lathes, hydraulic track jacks, hand cars, reamers, other machine tools and machinery, an engine and various supplies.

The following bids were opened January 10 at the Navy Department, Washington, for supplies for the Eastern navy yards:

- Bidder 3. Akron Electric Mfg. Company, Akron, Ohio.
- 33. Geo. F. Blake Mfg. Company, New York.
- 37. Buffalo Forge Company, Buffalo, N. Y.
- 54. H. L. Bond Company, Boston, Mass.
- 61. Chandler & Farquhar Company, Boston, Mass.
- 68. C. & C. Electric Company, New York.
- 73. Crocker-Wheeler Company, Ampere, N. J.
- 78. Chicago Pneumatic Tool Company, New York.
- 84. Drew Machinery Agency, Manchester, N. H.
- 87. Diehl Mfg. Company, Elizabeth, N. J.
- 99. M. T. Davidson, Brooklyn, N. Y.
- 114. Fox Bros. & Co., New York.
- 119. General Electric Company, Schenectady, N. Y.
- 128. R. W. Geldart, New York.
- 131. Holtzer-Cabot Electric Company, Brookline, Mass.
- 181. Montgomery & Co., New York.
- 186. Manning, Maxwell & Moore, New York.
- 222. J. Ed. Ogden Company, New York.
- 231. Peckham Company, Newport, R. I.
- 240. S. M. Price Machinery Company, Norfolk, Va.
- 253. H. A. Rogers Company, New York.

266. Southern Electric Company, Baltimore, Md.
 279. Julian Scholl & Co., New York.
 281. Sherman-Brown-Clements Company, New York.
 305. Vermilye & Power, New York.
 315. Western Electric Company, New York.
 321. Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.
 Class 1. Five induction motors—Bidder 321, \$3,003.30.
 Class 30. Portable electric hand drill, magneto testing set, &c.—Bidder 78, informal, part of class: 266, \$231.89.
 Class 31. One forge equipment—Bidder 37, \$255.80.
 Class 51. One road roller and 24 drag scrapers—Bidder 54, \$308.40; 84, \$392.80; 114, \$456.56; 128, \$308; 222, \$401.51; 279, \$316.88; 281, \$309.40; 305, \$360.
 Class 65. One 5 horse-power direct current motor—Bidder 3, \$280; 68, \$242; 73, \$235; 87, \$270; 119, \$227; 131, \$260; 292, \$292; 315, \$260.
 Class 87. One forge equipment—Bidder 37, \$832.
 Class 150. Spur gear cutters—Bidder 61, \$225.50; 181, \$225.32; 186, \$277.20.
 Class 164. Three Hercules shears—Bidder 61, \$72; 84, \$56.70.
 Class 165. One turntable for splitting shears—Bidder 231, \$300.
 Class 166. One worm wheel complete—No bids.
 Class 167. One core machine—No bids.
 Class 168. Two blast forges—Bidder 253, \$42.
 Class 169. One vertical wrecking pump—Bidder 33, \$185.
 Class 213. One horizontal Blake pump—Bidder 33, \$95; 84, \$86.35; 240, \$98.
 Class 214. Two vertical duplex steam pumps—Bidder 33, \$100; 84, \$104; 99, \$150.
 Class 215. Two vertical Featherweight air pumps—Bidder 33, \$3600; 99, \$2380.

Labor Notes.

The report of Lee S. Fisher, secretary of the International Machinists' Union, includes the following figures incident to the cost of conducting the losing Chicago strike, which is still nominally in effect: Estimated loss in wages, \$300,000; paid in strike benefits, \$156,000. The strike was called May 24, 1904, and has cost the union more than \$4700 a week for strike benefits alone. Eight hundred men were called out in the first place from 32 shops, and the majority of these men have been paid strike benefits amounting to \$7 a week for married men and \$5 a week for single men since that time. At present there are only about 500 strikers who are on the benefit rolls of the union, as some 300 have secured work in other directions. The interests of the employers were taken in hand by the Chicago Metal Trades Association and the campaign was so admirably managed by that association that after about 10 weeks' duration the strikers were practically defeated and the shops running full with non-union men.

Molders employed in the foundry of the J. I. Case Threshing Machine Company, Racine, Wis., operated under contract by E. H. Waller & Co., having demanded and been refused an increase in wages, quit work. The matter at issue between the contractors and the molders was not solely one of wages, the differences arising primarily from the limitation of output by the men in connection with union interference in the management of the shop. The foundry is run almost exclusively on the piece work plan, and the scale of prices is such that a molder of average ability can earn from 35 to 60 cents per day more than the union scale of wages in that locality. It is proposed in future to run the foundry on a strictly open shop basis, in accordance with the recent declaration of principles of the National Founders' Association.

The Vandyck Churchill Company, dealing in general machine tools in New York and Philadelphia, has secured the services of W. W. Nichols, who for the past year has been road representative of the Diamond Drill & Machine Company and before that was connected with W. E. Shipley, Philadelphia. Mr. Nichols will cover northeastern Pennsylvania.

R. T. Crane, who has done so much for manual training in the public schools of Chicago, now offers 15 scholarships in the Chicago Normal School to manual training students who attain the greatest proficiency.

National Metal Trades Association Notes.

CINCINNATI, OHIO, January 16, 1905.—At the annual meeting of the New York Metal Trades Association M. K. Bowman of the James Riley Repair & Supply Company was elected president; Charles L. Seabury, vice-president, and Christopher Cunningham, treasurer. The following gentlemen will constitute the Executive Committee: H. N. Covell, Andrew Fletcher, Jr., George O. Palmer, Robert S. Wyatt and M. P. Davidson. There will be a meeting of the association on the evening of January 21 at the Hotel St. Denis. This meeting will no doubt be of more than passing interest from the fact that the presidents and secretaries of many of the Eastern local Metal Trades associations will be present and participate.

The demand for machinists in St. Louis the past week has been good, and many of the first class mechanics who applied to the employment department of the St. Louis Metal Trades Association were placed. The three iron foundries that have been fighting the strike in that city for several months are now being operated in a very satisfactory manner, so much so in fact that it appears that the strike has practically been forgotten.

D. H. McPherson, secretary of the Manufacturers' Association of Philadelphia, has evidently convinced President Joseph Valentine and Vice-President Kief of the Iron Molders' Union of North America that his labor bureau is not a blacklisting institution. At a meeting of the Executive Committee of the association on the 11th inst. arrangements were completed for the meeting on January 24 at the Manufacturers' Club.

The annual meeting of the Employers' Association of Cincinnati will be held Wednesday evening, the 18th, at the Business Men's Club, and will be immediately preceded by a dinner. This meeting, it is anticipated, will be exceptionally interesting and profitable, as quite a number of prominent persons will be in attendance. The association is increasing its Executive Committee from 11 to 17 members, among whom are many of the city's most influential business men. Charles F. Waltz, who is the association's secretary, is an indefatigable worker, and the large increase in membership during the year is largely owing to his earnest efforts. He reports that the case of Joseph Valentine is still with the Grand Jury, a settlement not having yet been reached.

Commissioner Eagan is hard at work in Chicago securing new members for the association. He leaves there the latter part of the week for Toronto, Canada, where he will address a meeting of the Employers' Association of that city on January 19. On the 21st he will address the New York Metal Trades Association, thence going to Philadelphia, where, on the 24th, he will speak before the Metal Manufacturers' Association of that city.

Many of the secretaries of the local Metal Trades associations are advising their members that the work of the National Metal Trades Association, that has been carried on so successfully during the past few years—as evidenced by the manner in which Secretary Wuest handled affairs in Chicago during the late strike, as well as in other cities, preventing the spread of objectionable labor union tactics—is deserving the unanimous support of their members. He is receiving numerous inquiries regarding the association's seventh annual convention, to be held in Chicago on March 23 and 24. This meeting will be preceded by a regular session of the Administrative Council, at which time any point of interest suggested by members will be given consideration. To bring out suggestions of this character, he is requesting the various secretaries to forward such matter as will tend toward any improvement in the management.

Wendell P. Brown, who has been engineer for the King Bridge Company at its main office in Cleveland, Ohio, for several years, has been transferred to the company's New York office at 277 Broadway, succeeding Geo. E. Gifford, resigned, as Eastern representative. Mr. Gifford, who has filled the position above stated for the past 10 years, has accepted the position of contracting engineer with Milliken Brothers, 11 Broadway, New York.

New York.

NEW YORK, January 18, 1905.

Pig Iron.—The market has been rather quiet, there having been only a few sales of large lots. The market is quite firm, quotations being as follows: Northern Irons, at tide-water, \$17.75 to \$18 for No. 1 X Foundry, \$17.25 to \$17.50 for No. 2 X Foundry and \$16.75 to \$17.25 for No. 2 Plain. Alabama and Tennessee Irons are quoted \$17.50 to \$17.75 for No. 1 Foundry and \$17.25 to \$17.50 for No. 2 Foundry.

Steel Rails.—No large orders have been placed with the Eastern mills, the contract for 25,000 tons for the Baltimore & Ohio Railroad not having been closed as yet. We continue to quote \$28 for Standard Sections, at mills, and \$23.50 to \$25 for Light Rails.

Cast Iron Pipe.—While a number of inquiries are in the market, they are not at present running to large tonnages and it is expected that business will be quiet for a few weeks. This is in accordance with the expectations of the trade, as this season the demand set in so much earlier than usual. Much of the business done in December would have ordinarily come along about this time. The foundries are very busy and prices are firmly held. Carload lots are quoted at \$26.50 to \$27 per net ton for 6 and 8 inch at tide-water.

Finished Iron and Steel.—The volume of business is light in all lines and it is not expected that much activity will be shown this month. The time has hardly arrived, in fact, to gauge the business outlook for Structural Material. The requirements of the trade in the building line will hardly develop until some time in February, while the railroad and highway demand for bridges is not expected to put in much of an appearance until March and the later spring months. The inquiry for bridge work is scarcely up to what it was two months ago. Despite the present quiet conditions, it is believed that as the year progresses a good business will develop. The tonnage taken by the American Bridge Company in 1904 has not yet been totaled, but it will be somewhat over 80 per cent. of the tonnage secured in 1903. Plates and Bars are in fair demand, but no heavy contracts are now being placed, so far as can be learned. The mills are receiving good specifications on old orders and no concessions are being made in prices. Bars seem particularly strong. Quotations at tide water are as follows: Beams, Channels, Angles and Zees, 1.64½c. to 1.80c.; Tees, 1.69½c. to 1.80c.; Bulbs, Angles and Deck Beams, 1.74½c. to 1.85c.; Sheared Plates, in carload lots, 1.64½c. to 1.75c. for Tank, 1.74½c. to 1.90c. for Flange, 1.84½c. to 2c. for Marine, 1.84½c. to 2.50c. for Fire Box, according to specifications; Refined Bar Iron, 1.64½c. to 1.69½c.; Soft Steel Bars, 1.54½c. to 1.64½c.

Old Material.—The demand continues heavy, particularly for Heavy Melting Steel Scrap, Rerolling Rails and Cast Scrap. Consumers are in the market from the Central West and eastern Pennsylvania, as well as from local consuming interests. The inquiries coming to one firm aggregate 15,000 tons. During the week sales are noted of 1500 tons of Rerolling Steel Rails, 1000 tons of Cast Scrap, 1000 tons of Railroad Wrought Scrap, as well as numerous transactions involving smaller quantities. Quotations per gross ton, New York and vicinity, are approximately as follows:

Old Iron Rails.....	\$22.00 to \$23.00
Old Steel Rails, rerolling lengths.....	17.00 to 18.00
Old Steel Rails, short pieces.....	16.00 to 16.50
Relaying Rails.....	20.00 to 21.00
Old Car Wheels.....	16.00 to 16.50
Old Iron Car Axles.....	22.50 to 23.00
Old Steel Car Axles.....	20.00 to 20.50
Heavy Melting Steel Scrap.....	16.00 to 16.50
No. 1 Railroad Wrought Scrap.....	20.50 to 21.00
No. 1 Yard Wrought Scrap.....	18.00 to 18.50
Iron Track Scrap.....	19.00 to 19.50
Wrought Pipe.....	15.00 to 15.50
Ordinary Light Iron.....	12.00 to 12.50
Cast Borings.....	10.00 to 10.50
Wrought Turnings.....	13.00 to 13.50
No. 1 Machinery Cast.....	15.50 to 16.00
Stove Plate.....	12.50 to 13.00

Metal Market.

NEW YORK, January 18, 1905.

Pig Tin.—The market has continued quiet, with but a small aggregate of business transacted. The scarcity of spot metal here, however, owing to slowness in arrivals, the steamers being delayed, has served to keep the market firm. Futures, however, are lower and easy to obtain. At this writing spot Tin is quoted at 29.25c. to 29.75c.; January, 29c. to 29.50c.; February, 28.65c. to 28.95c.; March, 28.50c. to 28.90c., and April, 28.45c. to 28.87½c. London cables to-day report spot at £131 5s. and futures at £127 10s. 6d. The arrivals so far this month have amounted to 1070 tons, while 4211 tons are estimated as afloat.

Copper.—The market has continued steady, but quiet and without interesting feature, except that domestic consumers have purchased a little more freely in the past day or two for delivery during the next three months. Current quotations are: Lake, 15.25c. to 15.37½c.; Electrolytic,

15.12½c. to 15.25c., and Casting, 14.87½c. to 15c. The London market closed at £68 12s. 6d. for spot and £68 16s. 3d. for futures, showing a slight advance over last week's figures. Best Selected Advanced 5s., to £72 10s. The exports this month to date amount to 9935 tons. Shipments of Copper abroad this month have been considerably below expectation and it is thought that the total exports for January will not exceed 20,000 tons, which will be nearly 10,000 tons below the shipments of January, 1904.

Pig Lead.—Merely a moderate demand is noted for Lead, but the market is firm and unchanged. Spot Lead in New York is quoted at 4.60c. to 4.70c. The St. Louis market is quoted to-day at 4.52½c. to 4.62½c., according to brand. The London market is also without change, and was quoted to-day at £12 17s. 6d. The American Smelting & Refining Company still quotes on the basis of 4.60c. for "shipment" Desilverized in 50-ton lots.

Speleter.—A very firm market is noted, and the metal rules slightly higher, but was quieter to-day. Spot Speleter was quoted at the close at 6.25c. to 6.35c. The St. Louis market is unchanged at 6.10c. London cables show a decline, quoting £24 17s. 6d.

Antimony.—An accumulation of stocks which had been laid in on the strength of the high prices ruling in November, and a slow demand have conspired to weaken the market for Antimony materially. Prices declined again during the week, and the market closed with Cookson's ruling at 8.50c. to 9c.; Hallett's at 8.50c. to 9c. and other brands at 7.50c. to 8.12½c.

Quicksilver.—The London market is a shade lower and was quoted to-day at £7 12s. 6d. The market here is firm and unchanged, flasks of 75 lbs. being quoted at \$40.

Nickel.—Business is of about the usual proportions and prices are without change, large lots being quoted at 40c. to 45c. and smaller quantities at 50c. to 60c.

Tin Plates.—It is stated that some who bought Tin Plates at the lower figures ruling before the last advance are offering their surplus stocks at a shade under the current official figures. Nevertheless the mills, both the independent and those of the leading producer, are maintaining their prices firmly and all the plants are in active operation. The American Sheet & Tin Plate Company quotes on a basis of \$3.74 a box for 14 x 20 100-lb. Coke Plates, f.o.b. New York, or \$3.55, f.o.b. Pittsburgh. The Welsh market has declined 1 1/2d., to 12s. 4½d., f.o.b. Swansea.

OBITUARY.

EDWARD L. PHILLIPS.

Edward Lyndon Phillips, president of the Hewes & Phillips Iron Works, Newark, N. J., died suddenly January 14 at his home, in Chatham, Morris County, of heart disease. The day of his death was his fifty-fourth birthday. Mr. Phillips was born in Newark. His father was identified with the business interests of the city in his time, and at his death, in 1884, was the head of the iron manufacturing firm of Hewes & Phillips, which has been one of the foremost industries of the city for half a century. Edward L. Phillips was educated in the public schools and the Newark Academy, and served a regular apprenticeship in his father's works. After completing his full term there he went to Cornell University and was one of the early graduates of the mechanical school of that institution. With his brothers he conducted the large business of the iron works after his father's death and was made president of the corporation. He was constantly consulted by the leading mechanical engineers seeking practical aid. The company under his direction has manufactured many machines of original design as well as developing a large business in making Corliss and other steam engines. He took a deep interest in athletics, particularly in rowing, and was also a man of much public spirit. He was appointed one of the commissioners of voting machines by Governor Murphy two years ago, and his services were especially valuable to the State in dealing with the many difficult mechanical and business problems connected with the introduction of these machines. A widow and two daughters survive him.

C. S. BELL, past president of the American Foundrymen's Association and chief owner of the C. S. Bell Company, Hillsboro, Ohio, died January 3 of a complication of diseases, after an illness of two months. He was a native of Maryland and was born February 6, 1829. He attended the public schools until he reached the age of 15 years, and, having a taste for mechanics, found employment in a machine shop in Pittsburgh, where he learned the trade. He afterward removed to Ohio and for some years was engaged in business in Dayton, Springfield and Cincinnati. He removed to Hillsboro in 1858 and started a foundry, which has developed into a large establishment, manufacturing farm and church bells and cane mills, with a trade extending to all parts of the world. He is survived by a widow, one son and three daughters.

Trade Publications.

Roller Bearings.—Schleiffler Roller Bearing Company, Jackson, Mich. Circular No. 8. Illustrates and describes the Schleiffler patent roller bearings for shafting, cement cylinders, rolling mills, cranes, trucks and all classes of machinery.

Sand and Chilled Rolls.—The Philadelphia Rolling Machine Company, Twenty-third street and Washington avenue, Philadelphia, Pa. Leaflet concerning sand and chilled rolls.

Steam Specialties.—Donegan & Swift, 6 Murray street, New York. Illustrated catalogue showing the McDaniel, Chapman and Columbia expansion steam traps; McDaniel and Keystone exhaust pipe heads, relief valves for water pipes. Watson reducing valves, McDaniel suction tee; siphon or water lifter, separators, blow off valves and hydraulic valves.

Metal Lath.—The Truss Metal Lath Company, Incorporated, 15 Whitehall street, New York. Circular with drawings illustrating the Kühne sheet metal lath and its use.

Barometric Condensers.—The Alberger Condenser Company, 95 Liberty street, New York. Illustrated catalogue No. 4. Pages 48; 6 x 9 inches. Contains illustrations and descriptions of the Alberger barometric condensers, the use of one as a central condenser in connection with blowing engines, vacuum pumps, Corliss circulating pumps, centrifugal circulating pumps, barometric condensers in connection with cooling towers, exhaust relief valves, exhaust entrainers and surface condensers.

Machinery Supplies and Merchandise.—The Chicago House Wrecking Company, West Thirty-fifth and Iron streets, Chicago, Ill. Catalogue No. 136. Pages 350; 6 x 9 inches. The first few pages contain an interesting historical account of the company; how it obtains its goods, terms, shipping facilities, &c. The goods listed include an endless variety, as might be concluded from the company's statement that it buys anything manufactured. This particular catalogue is devoted more especially to machinery, hardware and tools.

Piping Systems.—The Norwalk Iron Works Company, South Norwalk, Conn. Celluloid card with a table of relative carrying capacities of different sizes of pipes for air, gas or steam. Intended to be tacked up in the engine room. Back is blank for memoranda.

Bench Tapping Machines.—The H. A. Tuttle Mfg. Company, South Norwalk, Conn. Illustrated circular describing its No. 1 and No. 2 bench tapping machines. No. 1 machine, capacity up to $\frac{1}{4}$ inch; height of machine, 15 inches; diameter of swing arm, $1\frac{1}{2}$ inches; center of tap spindle to column, 6 inches. No. 2 machine, same dimensions and an adjustable belt tightening bracket.

Alternators.—The National Electric Company, Milwaukee, Wis. Publication 65. Reprint of a paper entitled "Commercial Alternator Design," presented by W. L. Waters at the twentieth annual convention of the American Institute of Electrical Engineers.

Flexible Shafting.—The Coates Clipper Mfg. Company, 237 Chandler street, Worcester, Mass. Bulletin No. 18. Describes Coates flexible transmission shafting for driving various tools, such as breast drills, drill presses, magnetic hold ons, grinding wheels and all forms of angle drive.

Oil Pumps.—The Tokheim Mfg. Company, Incorporated, Cedar Rapids, Iowa. Two catalogues and circular. The first is a description of the Tokheim dome oil pumps, which have self measuring and price computing attachments. The second, entitled "The Gasoline Problem Solved," is more particularly concerned with gasoline automobile outfitts for filling the reservoirs of automobiles. These are shown in a number of forms. The circular deals particularly with what is called the safety long distance automobile outfit, one in which the gasoline tank is placed underground at some distance from the automobile house.

Machinery and Tools.—The C. E. Sutton Company, Toledo, Ohio. Eight bulletins and two price-lists. The following are the numbers and subject matter: Bulletin No. 530, single punches and shears; price-list accompanies it. No. 531, double punches and shears; price-list accompanies it. No. 533, blacksmiths' punches and shears. No. 534, forging machines. No. 535, foot power hammers. No. 536, milling machines. No. 537, trolley wheel machines. No. 538, lathes.

Steam Pumps.—A. S. Cameron Steam Pump Company, East Twenty-third street, New York. Illustrated pamphlet of steam pumps, a reproduction in part of a recent complete catalogue. Size, $3\frac{1}{4} \times 5\frac{1}{4}$ inches; pages, 52. Points to which attention is particularly called are simplicity, durability and the absence of outside valve gear or moving parts. The text gives a discussion on the simplex versus duplex type of pump and other useful information. It includes descriptions of various patterns of pumps, with specifications of sizes. Several patterns of horizontal pumps are shown, and a few patterns of vertical sinking pumps.

Spiral Riveted Pipe.—The Abendroth & Root Mfg. Company, Newburgh, N. Y. Folded mailing card, address of the receiver being printed on an inserted card, which may be used as a reply card to request a copy of new price-list and hand book. The folded card is entitled "A Purchase Index for the Man Who Buys." It shows number of illustrations, two of which are indicative of the lightness and strength of spiral riveted pipe. Others show the A. & R. exhaust head, a spiral riveted bilge pump and views of the works. A portion of the card, which is intended to be cut out and filed in an index, lists the complete line of product of the company.

Contractors' Equipment.—The Cockburn Barrow Machine Company, 234 Eleventh street, Jersey City, N. J. Catalogue C. Particularly concerns tunnel construction, and gives illustrations and descriptions of patent tubular frame wheelbarrows for dirt, pig metal, coal, &c., self dumping hoisting tubs, dump cars, ash and coal buckets, quick acting punching machines, concrete mixers, steam hammers, tunnel shields and air locks, flanging clamps, concrete buckets, cable grips and the Ames patent air lock governor.

Leather Belting.—Graton & Knight Mfg. Company, Worcester, Mass. Three circulars. All concerned with the Neptune water proof leather belts, guaranteed to run in a damp place, or even wholly submerged in water, without having the laps loosened. One of the circulars gives a reprint from the St. Louis *Lumberman* concerning the company's belting display in Machinery Hall at the recent St. Louis Exposition.

Time Registers.—The Crouse-Hinds Company, Syracuse, N. Y. Illustrated catalogue descriptive of the Hawley time register. This is a self computing form making graphic records with lines instead of figures to indicate the length of each employee's stay in the shop, doing away with the calculations necessary when the actual time is recorded. Each chart contains a week's record, and the records are made by the pushing of a button. Inclosed with the catalogue is a *fac-simile* of a chart.

Portable Gasoline Engines.—The Gemmer Engine & Mfg. Company, Marion, Ind. Circular and leaflet. Former describes portable gasoline engines for running shredders, huskers, clover hullers, threshers, grinders, wood saws, &c. The leaflet shows the "all day digger" $1\frac{1}{2}$ horse-power pumper with a capacity of 38 gallons per minute through a height of 100 feet.

Safety Passenger Car.—J. E. Page, 3323 Lexington Avenue, Kansas City, Mo. Abstract of an article from the *Railway Carmen's Journal*, entitled "The Latest in Non-Telescopic Cars," being a description of the construction and action in time of collision of the Page safety car.

Power Pumps.—The Goulds Mfg. Company, Seneca Falls, N. Y. Folding mailing card, giving illustrations of power pumps for water works and fire protection, of the form described in *The Iron Age* of December 29, 1904, and others. It shows a *fac-simile* clipping from the Montreal *Star* concerning the recent fire at Shawinigan Falls and the good work these pumps did.

Variable Speed Motors.—The Crocker-Wheeler Company, Ampere, N. J. Flyer No. 253. Concerns a new line of variable speed motors.

Forgings and Castings.—The Newhall Chain, Forge & Iron Company, 9 Murray street, New York City. Catalogue No. 185. Size 6 x 9 inches; pages 32. Describes the manner of making and long wearing qualities of the Warwick and Trident welded chains. Also deals with special forgings, such as connecting links, hooks, shackles, spikes, bolts, &c., and castings such as cleats, chocks, mooring posts, towing bits and scow castings.

Steel Ties.—The Avery Stamping Company, Cleveland, Ohio. Circular descriptive of steel ties for industrial, mine, steam and electric roads.

Turbines and Centrifugal Pumps.—The I. P. Morris Company, Port Richmond Iron Works, Philadelphia, Pa., owned and operated by the Wm. Cramp & Sons Ship & Engine Building Company. Bulletin No. 1, size $8\frac{1}{2} \times 10\frac{1}{4}$ inches; pages 52. Profusely illustrated with descriptions of installations of turbine machinery, including the plant of the Niagara Falls Power Company, Niagara Falls Hydraulic Power & Mfg. Company, the Canadian Niagara Power Company, the Trenton Falls plant of the Utica Gas & Electric Company, Trenton Falls, N. Y., and the Shawinigan Water & Power Company, Shawinigan Falls, Canada. The latter part of the catalogue concerns centrifugal pumping machinery, and describes among notable installations the pumping stations of the New Orleans Drainage Commission.

Injector Sand Blast Apparatus.—C. Drucklieb, 132 Reade street, New York City. Circular. Illustrating and describing a sand blast apparatus which makes use of the principle commonly applied in steam injectors. By means of compressed air it imparts a velocity to the sand enabling it to clean castings, remove scale and rust from iron and dirt from the stone and brick work of buildings and other similar work.

Valves.—Fairbanks Company, 701 Arch street, Philadelphia, Pa. Leaflet concerning the Fairbanks brass and iron globe, angle and cross valves with renewable vulcanized asbestos disks; brass and iron gate valves with seats of the same material, and straightway check valves with swinging and rotating brass disks. It refers to a more complete catalogue.

Calendars.

Wm. J. Oliver Mfg. Company, Dale avenue, Knoxville, Tenn. Hanger monthly calendar giving views of contractors' and mine cars and cross section of a patent lubricated car wheel.

Hendrick Brothers, 49 Cliff street, New York City. Red seal bound diary or daily engagement reminder, containing tables of useful information.

The Morgan Engineering Company, Alliance, Ohio. Hanger panel, 20 x 28 inches, reproduction in colors of an oil painting entitled "Vulcana, Daughter of Vulcan." A monthly calendar is attached.

W. H. Schott, engineer, 1218 Marquette Building, Chicago, Ill. Monthly calendar with central feature a half-tone engraving entitled "Declaring a Dividend," which represents two newsboys squaring their accounts. It is mounted in a heavy cardboard frame $13\frac{1}{2} \times 19$ inches.

HARDWARE.

THE attention of the trade has been directed from time to time in many ways to the matter of organization, as both merchants and manufacturers are to a greater extent than ever before coming together in associated form for the advancement of their respective interests. In addition to the special agreements between manufacturers of particular lines of goods which have long had great influence in determining market conditions there has been within recent years a marked tendency toward their organization on broader lines, so that at the present time the manufacturers of the country are represented by a strong national organization and the Hardware manufacturers have constituted one which is thoroughly representative of the large and diversified interests of this important branch. In connection with jobbing interests the matter is carried further, with more completeness and efficiency, a movement in which the Southern Hardware Jobbers' Association occupies an important place as a pioneer in trade organization. The rise of retail Hardware associations is of more recent date and their progress and influence are a marked feature of the trade.

Notwithstanding the limitations which there must be to the success with which associations carry out their special projects there are few informed in regard to these organizations who are not ready to acknowledge the advantage they are to those for whose special benefit they are constituted, and also to the trade as a whole.

I. In the accomplishment of the special purposes for which they are organized there is no doubt that as a rule these associations succeed in justifying their existence. Instances will occur to those in close touch with such matters of action taken by organizations of jobbers, for example, which resulted much to their advantage, as better terms were obtained from manufacturers, or a concert of action secured among the trade by which prices were maintained or the association's interests in one way or another promoted. Those identified with retail organizations can cite many instances also in which united action resulted in the correction of trade abuses and in the protection of retail interests in many ways.

II. The broadening influence of connection with a trade association is perhaps more important. Matters which would not otherwise come up for definite consideration are thus brought to the members' attention, and trade questions are consequently considered in a broader spirit and from a different and more just point of view than is furnished by the individual's interest considered by itself. These influences are accentuated by attendance at the meetings, when there is the coming together of a large number of men engaged in the same business, many of whom are persons of prominence and ability. The associations thus do something to get the membership out of the rut into which they are, despite their intentions and protests, apt to fall, and to invigorate them with a new and more enterprising spirit.

III. There is, too, much to be learned by the open minded business man from conferences with those engaged in similar pursuits. The interchange of experience and opinion, the description of methods which have been found advantageous, the frank acknowledgment even of difficulties which are encountered, are all suggestive, instructive and stimulating to those who are studying the tendencies of trade and are on the lookout for desirable modifications of plan or method in connection with the prosecution of business. The members of any live asso-

ciation, whether of manufacturers or of wholesale or retail merchants, who are at all open to suggestion or influence of this character agree with substantial unanimity as to the advantage of this contact with their associates which they are thus permitted to enjoy.

IV. If the trade associations were limited to any one class, as, for example, either to jobbers or to retailers, there would not be for the trade at large or for the separate associations the same benefit that there is when all classes in the trade are efficiently represented by organizations devoted to their various special interests. By means of the associations which exist no one class in the trade is permitted to have everything its own way. The jobbers, for example, have forced home upon them the fact that there are manufacturers on the one side and retailers on the other who are in an entirely friendly way, it may be assumed, watchful and vigilant in looking out for their rights and emphasizing their position in various matters in which in the very nature of the case there must needs be some conflict of interest. Association members are thus brought into contact with the Hardware field as a whole and compelled to regard the interests of those in the different departments of the trade as well as their own. In this way there is secured a more just appreciation of the real bearing of the questions which present themselves, permitting and, indeed, requiring a broad view of the subjects. The various elements in the problem being thus taken into account with the recognition of the rights and privileges of the other departments of the trade, manufacturers and merchants alike are in a position to reach just decisions on questions under consideration, to determine upon reasonable policies and to take action in accordance with all the conditions and tendencies of the trade. In thus promoting harmonious relations based upon thorough knowledge of the facts and a frank recognition of the deference which must be paid to the interests and even the opinions of others, the Hardware organizations are unquestionably doing a most important work not only for the benefit of the special classes in whose interests they are organized but for the welfare of the trade at large.

Condition of Trade.

The activity in soliciting business by the traveling representatives of manufacturers and wholesale houses is having its influence, and orders are beginning to come in more freely than has been the case since the opening of the year. There are indications, however, that the market is feeling the effect of the liberal buying which characterized the closing months of 1904, as a result of which the larger houses have pretty well covered their requirements for the present. As a consequence trade has since January 1 been relatively quiet so far as transactions with the larger houses are concerned. This is not regarded as in any way casting a shadow on the bright anticipations of business during the season, but as being a natural result of the activity which has prevailed, especially as the early and liberal purchase of goods has no doubt been justified by the strength of the market and the prospect for a large demand. Retail merchants are not as yet buying very liberally, but jobbers report an increasing inquiry and a larger volume of business, with an excellent feeling and anticipations of profitable trade. The market continues to have a strong tone, and lines which were slow to feel the effect of the greater cost of iron and metals are responding to the tendency toward higher values. At the same time a great many goods are unchanged and likely to remain without material modifi-

cation in prices, but in sympathy with market conditions irregular concessions or extra discounts are being withdrawn and prices made more uniform though without important change of level.

Chicago.

In spite of the intensely cold weather which has prevailed during the last week throughout the West orders are being received by jobbers and manufacturers for spring and summer goods in unusual volume, and frequent reorders are received for Skates, Sleds, Snow Shovels and other midwinter merchandise. January will be a big month in the trade. Notices of advances in prices are frequent, though no very important lines are covered in this week's schedule. Hardware articles containing rubber are rapidly advancing in price in proportion to the phenomenal increase in raw rubber cost. Trade this winter on Pipe, Elbows, Registers, Hods and Stove and Furnace Fittings generally has been exceptionally large, though on Registers prices have ruled so low, even with the last advance, that profits are said to be small.

Cleveland.

THE W. BINGHAM COMPANY.—Business for 1905 starts out in good form and volume, and many of our customers have taken advantage of our advice of 30 to 60 days ago and have purchased goods at prices which were in effect at that time, and have now in stock a lot of goods at very low prices. There is yet room for others to come under cover if they will do so at once.

A large amount of business is being booked for Lawn Mowers, Freezers, Step Ladders, Wire Cloth, Netting, Steel Goods, and many other lines that will be used in the early spring and summer. There has been a lot of senseless cutting in the prices of Poultry Netting and Screen Wire Cloth, and we understand that now the manufacturers are obliged to pay an advanced price on Wire, as their old contracts are pretty well drawn up. It looks as though there should be an advance in the price on this class of goods at once. You had better buy early and take the goods into stock rather than take your chances later on and pay higher prices and not be able to get the goods promptly.

Wrought, Cast, Plain and Fancy Butts and Strap, T and Screw Hook and Strap Hinges are being sold in large quantities at the present time. The manufacturers under date of December 20 issued a new list on Strap Hinges and a new discount on December 31 to take effect at once. The small advances over former prices considering the cost of raw material and advances in labor seem to be fully justified. Bolts of all kinds are cheap at the present time. There is room for improvement in prices, and new prices should be put in force at once.

Steel Goods we advise customers to buy at net prices. There is such a diversity of discounts that one hardly knows where he is at, but when he buys at net prices he knows just what each kind of Fork or Hoe is going to cost him. The American Fork & Hoe Company informs us that it sells its first quality or factory brands under its own name only, and its second quality under special names. It would seem from this that the best thing for dealers to do is to buy the manufacturers' own brands in order to be sure of getting what they are paying for.

Screws are cheap at present prices. Files are a good purchase at present prices; also House Trimmings, especially Lock Sets. There are many good ones and a lot of poor ones on the market. The trade should examine carefully the different grades that are offered and buy quality, and not be put off on goods with a name only and no quality. A cheap made up Lock Set is a poor thing for any one to have, but a good one is a joy forever.

There is considerable call for Plain and Galvanized Sheets, also Steel and Iron Merchant Pipe. Large quantities of Malleable, Cast and Brass Fittings are being sold, showing that there must be a large consumption of these goods all over the country.

You had better buy your Shovels, Spades and Scoops early. It looks as though there is going to be a scarcity in the early spring months, as there is a shortage of good

Handles. The price at which many Shovels have been sold is not at all entertaining to some manufacturers, and there is a chance for a decided advance, or there should be at least a stiffening up in prices.

Spring trade in Mining, Milling, Manufacturing and Mechanics' Supplies, House Trimmings, House Furnishing Goods and General Hardware bids fair to be very large. We have more inquiries for prices coming in at present than is usual at this time of the year, indicating that the retailers have inventoried their stocks and found that they have a good many vacant places on their shelves that they must fill up in anticipation of the good trade that is surely coming to them.

St. Louis

NORVELL-SHAPLEIGH HARDWARE COMPANY.—Starting with a blizzard which covered the earth with snow and ice, exceedingly cold weather has prevailed in this section the past week. Orders from our salesmen have compared favorably in numbers with those of the same period last year. Mail order business shows a falling off. It is evident in extremely cold weather merchants do not volunteer orders. During periods of extreme cold it is also interesting to note the effect upon salesmen. The successful man goes right ahead traveling and selling goods. He manages to get around somehow. Nothing seems to be the matter with his health. The man you have been nursing in your hope department immediately, to copy his letter, "contracts a severe cold and is compelled to remain at home."

One indication of the prosperous condition of the country is the unusual number of new stocks that have been bought the past two weeks. There are a good many others in sight to be purchased in the near future. There is almost always very lively competition for these opening bills, and the skilful and popular salesman generally wins the day.

Recently we keyed a number of advertisements by asking dealers to write for a little pamphlet entitled "Twenty-five ways to increase your business." The expert of an advertising agency told the writer we would be very much disappointed in the number of requests for this pamphlet. He is in charge of a general advertising business and has had wide experience. The Hardware trade must be different, because we have received a great many requests for this pamphlet from all parts of the country. It is evident Hardware dealers do read advertisements.

The year starts with prices very well maintained in a general way. The worst demoralization in spring lines seems to be on Screen Doors. When a jobber figures up storage and cost of handling this bulky line he would certainly be better off under present conditions if he did not handle the goods.

The larger jobbers seem to have little difficulty in having their customers understand that in order to get the 2 per cent. cash discount remittances must be made within 10 days from date of invoice. We note, however, when our salesmen open an account with some regular customer of a small jobber it takes us some little time to get this customer to understand that 10 days means 10 days. The custom indulged in by many small jobbers of permitting their salesmen to collect accounts on their monthly trips, allowing the cash discount, is evidently very much abused. Would it not be better for all concerned if the trade were educated to remit direct to the house instead of paying a salesman? Does not a salesman's weekly report of collections, allowances, claims, &c., cover a multitude of sins? Is it possible for a man to be a good salesman and a good collector? If he is very anxious to sell goods will he not be inclined to be somewhat easy on claims and collections? If he is too hard in the way of collections and too stiff on claims will it not affect his results as a salesman?

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—This is the season of the year when the wholesale Hardware business comes with a rush in this section of country, but it is sometimes interrupted by bad weather, such as an unusual amount of snow or high water. There has been since the first of the month only a fair volume of Hardware business. We have had unusually cold weather,

with considerable amount of snow, which has had a tendency to retard and delay the opening of the spring trade. Six-cent cotton all over the Southern country is not conducive to large purchases of either Hardware or any other lines of goods. The fact is pretty well established that we made 13,000,000 bales of cotton. A portion of this was sold at 9 to 10 cents per pound. If we get 6 cents for the remainder our country will be in better fix than it has been for many years, but if we endeavor to hold this cotton and not realize on it it will necessarily put us in financial straits for the time being. The effect of trying to hold cotton has already been felt in the jobbers' collections, notwithstanding banks throughout the country have been very liberal in loaning money on cotton.

We have had a better trade since the decline in the price of cotton than we expected, and we are firmly of the opinion that when the people become reconciled to the new conditions and realize that they can afford to sell the remainder of the crop at the present market price without going into bankruptcy, and actually with a pretty good balance to their credit, a sufficient amount of the crop will be marketed to relieve the situation and create an unusual demand for goods. All other farm products have been marketed at a good price, and the low price of cotton is absolutely the only thing between the Southern planter and perfect happiness and contentment.

Omaha.

LEE-GLASS-ANDRESEN HARDWARE COMPANY.—After having enjoyed a record breaking holiday trade business has settled down to the usual midwinter schedule. The record of 1904 shows a very large volume of business transacted and the results indicate a healthy growth, with commensurate benefits. The new year so far has not developed any new features of general interest. Traveling men started out promptly after the first of the year and as a rule have been the recipients of liberal orders.

It is expected that a season of comparative quiet in business circles will intervene between now and the opening of the spring campaign. This, of course, is customary. The general feeling, however, of business men throughout the trans-Missouri region is one of uniform confidence, and the conviction prevails that all conditions point to a heavy volume of business, at least until the new crop begins to attract attention. This is conceded on all sides as a foregone conclusion. The recent advances in prices of raw material and the basic products have stimulated trade already to a certain extent, and it is believed by many that a higher range of values is not at all unlikely.

The condition of the entire Western country may be stated as one of healthfulness, progression and prosperity. Never in its history has it enjoyed such an independently financial position. A series of years of immense crops at remunerative prices has placed producers out of debt, leaving a handsome surplus for further enterprises, and for this reason general business has flourished continuously and in all probability will continue to increase.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The market is devoid of any startling features. The weather has been such that all the Bar and Wire mills in this vicinity could run and turn out fair product. The bulk of the buying was undoubtedly done before the first of the year, so that there is not a strong push for new booking such as there might be if wants were not already pretty well provided for.

As the market continues to harden and advance a little there is talk of still further advances. That is always the case. The brokers were never so cock sure of 20-cent cotton as 48 hours before the first big slump came.

Of course, if Congress is going to take a hand in the regulation of prices, either transportation or industrial, there would necessarily be some considerable disturbance, but there is an abiding faith in the common sense of the people and their representatives which will head off anything radical enough to precipitate disaster.

Money continues easy, which in itself is a reassuring sign. Preparations now are making for next year's crops,

the country towns are well supplied with money and nobody seems discouraged. The Ohio River is open at last, the first time in many months. Navigation is somewhat interfered with by reason of the strong floating ice, but anything that looks like water or H₂O is so welcome in this part of the country that we willingly take it solid or liquid, in whichever form it is bestowed.

Boston.

BIGELOW & DOWSE COMPANY.—January finds New England in a quiescent state, for the inclement weather gives to all outside work the "cold hand." Last winter the ground was covered with snow and the sleighing was continuous for several months. This winter has been more variable, and there has been hardly snow enough for the farmers and the woodmen to do their work. Heavy snowstorms have been succeeded by torrents of rain. Severe tempests have made the ocean a terror to the mariners, and the number of ships wrecked and unheard from breaks the record. The farmers do not wander far away from their own firesides, and every one seeks shelter. Merchants are preparing for the magic change which will come when the winter breaks. Advance sales for spring goods indicate a feeling of confidence in the future. The advancing market has induced large sales of Wire Nails and Wire Fencing, which are usually placed for March shipment, but this year have been stocked two-months in advance. All are imbued with the feeling that the range of prices will be higher as the season advances and are placing their orders on this basis. There is a very strong feeling among all dealers to maintain manufacturers' advances. The outlook is cheering and remittances are very good.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—The winter so far throughout the Pacific Northwest could hardly be better for outdoor work either for building or farming operations. Locally it is fortunate that such is the case, as it allows work to progress rapidly on Government buildings for the Lewis and Clark Exposition, contract for which was let so late in the season that it hardly seemed possible they could be completed in time for opening June 1. The buildings are now so far along that completion seems to be assured. All the larger exhibit buildings are now finished and ready to receive exhibits, carloads of which are coming in daily.

Trade, as is to be expected in January, is quiet and is likely to continue so until March. Of late there seems to be a better demand for cattle, and more have been sold than during the past two years, although prices are still low and unsatisfactory. With prospects good for crops, price on wool high and demand strong, trade should open satisfactorily in the spring.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—Since January 1 salesmen have been preparing for their duties and correcting prices where changes have been made by manufacturers for the early spring campaign; consequently clerical force are all busy and actively employed. There is every appearance of a bright opening for spring trade.

NOTES ON PRICES.

Wire Nails.—Mills are employed in filling specifications on contract orders, which are coming in freely. While there is some new business, the volume is not nearly so large as that preceding the new year. The market remains firm with, as yet, no announcement of an advance in prices, which, however, it is believed will be made in the near future. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Carload lots to jobbers.....	\$1.75
Carload lots to retailers.....	1.80

New York.—Demand is moderate but seasonable; all, in fact, that jobbers are expecting. The market is firm at the following quotations: Single carloads, \$1.94½; small lots from store, \$2.

Chicago.—Mills are reported as being full of orders, but not sufficiently so but that they can take care of cur-

rent business. Prices are held firmly at \$1.90; base, in car lots to jobbers, and \$1.95 to retailers, with 5 cents extra for less than car lots from mill.

Pittsburgh.—Demand for Wire Nails is not as active as it has been, this being due to the season of the year, which is always a dull one, and also to the fact that buyers bought heavily before the recent advance in prices and are now specifying on these contracts quite freely, which is giving the mills a fair amount of work. As yet no announcement has been made of an advance in prices. We quote Wire Nails in carloads to jobbers at \$1.75 and in less than carloads at \$1.80, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days.

Cut Nails.—Current orders received by the mills are not of heavy volume, but filling contracts is keeping the mills busy. The market continues firm. Quotations are as follows: Carload lots, \$1.75; less than carload lots to jobbers, \$1.80, and to retailers, \$1.90, f.o.b. Pittsburgh. Iron Cut Nails, for delivery at Pittsburgh, Buffalo and all points west of these cities, 10 cents advance per keg on Steel nails.

New York.—A light but steady demand characterizes the market, which is firm. New York quotations are as follows: Carloads on dock, \$1.89; less than carloads on dock, \$1.94; small lots from store, \$2.

Chicago.—Association prices on Steel and Scrap Iron Cut Nails are unchanged as follows: \$1.90 for car lots to jobbers, \$1.95 in car lots to retailers, with 5 to 10 cents advance for less than car lots from mill, according to character and size of order.

Pittsburgh.—A meeting of the Cut Nail Association is to be held on January 25, but no advance in prices is likely unless Wire Nails should be put up in the meantime. New orders for Cut Nails are rather light, but the mills are busily employed on contracts. Prices are very firm and we quote: Carloads, \$1.75, base; less than carloads to jobbers, \$1.80, base; less than carloads to retailers, \$1.90, base, plus carload rate of freight to point of delivery; terms 60 days, less 2 per cent. off for cash in 10 days. Iron Cut Nails for delivery at Pittsburgh, Buffalo and all point west of these cities are 10 cents a keg higher than above prices.

Barb Wire.—Indications point to a large spring business, while mills have a fair amount of contract orders which they are filling. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$1.90	\$2.20
Retailers, carload lots.....	1.95	2.25
Retailers, less than carload lots.....	2.05	2.35

Chicago.—The outlook is for an exceptionally large spring trade, as it is opening up earlier than usual, particularly in the opulent corn belt. Present official figures in car lots to jobbers at Chicago are as follows: Painted Wire, \$2.05; Galvanized, \$2.35; retailers, car lots, 5 cents higher; less than car lots, \$2.20 Painted; \$2.50 Galvanized. Staples, Bright, \$2; Galvanized, \$2.30.

Pittsburgh.—New business is light, but the mills have a fair amount of contracts, on which specifications are coming in quite freely. Prices are unchanged and the tone of the market is quite firm. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$1.90	\$2.20
Retailers, carload lots.....	1.95	2.25
Retailers, less than carload lots.....	2.05	2.35

Smooth Fence Wire.—The anticipation of buyers in covering their requirements before the first of the year has necessarily curtailed the volume of business usual at this season. Mills are therefore working on contract specifications. The market is firm in tone and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent discount for cash in 10 days:

Jobbers, carloads.....	\$1.60
Retailers, carloads.....	1.65

The above prices for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12 & 12½	13	14	15	16
Annealed.....	Base.	\$0.05	.10	.15	.25	.35	.45	.55
Galvanized.....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago.—Owing to the high prices for raw materials there is little temptation to shade official prices, which are \$1.75 for base sizes of Annealed Wire in car lots to jobbers, \$1.80 in car lots to retailers, with 5 cents extra for less than car lots. Galvanized Wire maintains its regular extra of 30 cents over Annealed.

Pittsburgh.—Demand is fairly heavy, but is not as large as in December, when the mills booked quite a heavy tonnage and are now running on specifications on these orders. Trade is divided in its opinion as to the probability of an advance in prices. It is hardly probable prices will be put up unless demand materially improves. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.60
Retailers, carloads.....	1.65

Griffin Mfg. Company.—The Griffin Mfg. Company, Erie, Pa., has adopted the following new list on Long Chest Hinges, which is subject to a discount of 60 per cent.:

Long Chest Hinges No. 1811.

	6	8	10	12 inch.
	\$1.00	1.35	1.50	2.15

Binder Twine.—It has been questioned whether the Harvester Company was desirous of obtaining orders at the prices it announced. Reports, however, are to the effect that orders have been taken for a considerable quantity of Twine, but this can be regarded only as rumor, as the report has no official sanction. It is reasonable to suppose, as there is no guarantee, that the largest interest will modify its prices in accordance with conditions, including any marked change in the price of Sisal fiber. The comparative small decline of ¼ cent per pound since Twine prices were announced has not resulted in any change in the quotations on Twine, which are as follows:

	Per lb.
Sisal	9½c.
Standard	9½c.
Standard Manila (550 feet)	10½c.
Manila (600 feet)	11½c.
Pure Manila (650 feet)	12½c.

Five-ton lots, ½ cent less; carload lots, ¼ cent less, Chicago delivery, usual terms of payment. Kansas City, Omaha, Council Bluffs and Minneapolis, ¼ cent added. Prices not guaranteed. Allowing for freight, New York prices would be ¼ cent lower than the above.

Rope.—There is a continuation of the moderated demand which has been a natural feature of the market for the past month. Prices show no weakness and are well maintained at the following base for 7-16-inch diameter and larger: Pure Manila, 11½ to 12 cents; Mixed Manila, 10 to 10½ cents; Pure Sisal, 10 cents; Mixed Sisal, 8 to 8½ cents per pound.

Window Glass.—At the meeting of the Executive Committee of the Manufacturers' and Jobbers' Window Glass Company held last week an advance in the minimum price at which manufacturers may sell jobbers was made, according to report, as follows: First three brackets single, 90 and 10 and 5 per cent. discount; larger sizes, both single and double, 90 and 10 per cent. discount. New York jobbers are quoting without change as follows: First two brackets single, 90 and 15 per cent. discount; larger sizes single and all double strength, 90 and 5 per cent. discount; all from jobbers' list of October 1, 1903. The demand is active for the season.

Oils.—*Linseed Oil.*—There are no developments of interest, as demand is confined to small lots, the distribution of which is limited. State and Western Raw Oil can be purchased at 40 cents per gallon in car lots, but crushers are willing to accept orders for delivery only during January, February and March. There is no business being done on this basis. No change has taken place in card prices, which are as follows: City Raw, 43 to 44 cents, according to quantity; State and Western Raw, 41 cents per gallon, for large or small quantities.

Spirits Turpentine.—The Southern market remains strong in tone and higher in price, this condition being ex-

plained as the result of smaller receipts and a better export demand. An estimate has been made by those more or less familiar with the situation that 30,000 barrels of Turpentine at Savannah are not on the market, but being held for higher prices. Prices have advanced rapidly since our last report, as shown by the New York quotations, which, according to quantity, are as follows: Oil barrels, 56½ to 57 cents; machine made barrels, 57 to 57½ cents per gallon.

DEATH OF WILLIAM C. PETERS.

WILLIAM CRAMP PETERS, one of the ex-presidents of the Philadelphia Hardware Merchants' and Manufacturers' Association, died at his residence in Germantown, Pa., Sunday, January 15, in his seventy-first year. Mr. Peters was born in Philadelphia, August 7, 1834. He entered the Hardware house of Dilworth, Branson & Co. when about 15 years old, and from that time to the date of his death maintained an unbroken connection with the business, which was carried on successively by Dilworth, Branson & Co., Vance & Landis Company and James M. Vance & Co., as at present. Mr. Peters was given an interest by the firm of Vance, Landis & Co. in



WILLIAM CRAMP PETERS.

1864 and was later taken into full partnership. At the death of James M. Vance, in 1888, he became senior partner, and for the last 35 years had the active management of the business. Last May he went to Europe for rest and recreation and was taken sick with typhoid fever in Rome, from which he never fully recovered. He was regaining his health and strength when stricken with pneumonia. Mr. Peters was a member of the National Guard during the late Civil War and was a member of Veteran Corps, N. G. Pa.

Mr. Peters was a peculiarly lovable man, even tempered, kindly and of a most generous disposition. He was what might be called a representative business man of the old school, and as such was held in the highest esteem. He was a ruling elder in the Mount Airy Presbyterian Church and was also superintendent of the Sunday school connected therewith. He was, indeed, prominent in everything that had for its object the betterment of his fellow man individually or collectively.

A meeting of the members of the Hardware Merchants' and Manufacturers' Association of Philadelphia was held at its rooms on Tuesday afternoon, for the purpose of passing resolutions of condolence and sympathy with Mr. Peters' family. A committee consisting of Hugh McCaffrey, James H. Ritter and John R. Griffith was appointed for this purpose, with instructions to prepare a suitable memorial, which should be placed on the records of the association and a copy forwarded to the family.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our Catalogue Department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made besides the brief reference to the catalogue or price-list in this column.

THE M. B. SCHENCK COMPANY, Meriden, Conn.: Catalogue showing Yale, Gem, Steel Gem, Rugby, Piano, Stove and Stationary Casters. The company has recently added to its line Steel Gem Casters, which are made of pressed steel, strong and unbreakable.

THE WIRE GOODS COMPANY, Worcester, Mass.: Discount sheet applying to the company's Catalogue No. 5, January, 1903, and illustrating also articles which have been added to its line since the issue of that catalogue.

THE TAPLIN MFG. COMPANY, New Britain, Conn.; New York office, 155 Chambers street: Catalogue illustrating Dover Egg Beaters and Cream Whips, Towel Racks, Folding Garment Hanger, Bottle Stopper and Opener, Soaps, Sanitary Bathroom Fittings, hotel and club goods, &c.

AUTOGRAPHIC REGISTER COMPANY, 10 West Twenty-third street, New York: Catalogue of Shoup Pioneer Autograph Registers, supplies, manifold books, systems for shipping, orders, invoices, cash or charge sales.

THE STANDARD STAMPING COMPANY, Marysville, Ohio: Pamphlet devoted to the Standard Carriage Heater, a combination footstool and heater, burning a prepared carbon.

J. STEVENS ARMS & TOOL COMPANY, Pope Department, Chicopee Falls, Mass.: Catalogue of Rifle Barrels and specialties, including muzzle loading outfit, muzzle loading Mold, Rear Wind Gauge and Elevating Sight, Loading Flask, Palm Rest, Rifles, Telescope Sights, &c.

THE SEEDER MFG. COMPANY, Homer, Mich.: Calendar and sheets illustrating the following grass seed Sowers: Michigan Wheelbarrow, Michigan, Mitchell and Long Distance.

LOWE BROTHERS COMPANY, Dayton, Ohio: Convention number of "The Little Blue Flag," January, 1905, relating to the company's Paints and including report of its recent convention.

R. E. DIETZ COMPANY, New York, Warren McArthur, exclusive sales agent, 46 Lake street, Chicago, Ill.: "Dietz Blue Book," price-list No. 37.

VAUGHAN & BUSHNELL MFG. COMPANY, 867-891 Carroll avenue, Chicago, Ill.: Illustrated descriptive 1905 catalogue, superseding former editions, relating to Hammers, Blacksmiths' Tools, Ice Tongs, Hitching Rings, Cotton, Hay, Hog and Meat Hooks, Ham Stringers, Hog Scrapers, Screw Driver Bits, Drop Forged Wrenches, Post Hole Diggers, Drive Punches, Nail Sets, &c. The company has recently added to its line Nails, Riveting and Ball Pein Hammers, also a Hoof Paring Nipper.

THE DAVENPORT LADDER COMPANY, Davenport, Iowa: Catalogue and price-list relating to Ladders, including single spruce and pine; Extension and Fire Ladders, Fruit Pickers and Window single and extension Ladders, Step Ladders, detachable Roof Hooks, Trestle Ladders, &c.

SIDNEY SHEPARD & Co., Buffalo, N. Y., and 21 Cliff street, New York: A 24-page illustrated pamphlet of "Notable Kitchen Specialties," many of which are patented and all of which are of a quick selling and profitable character, some being entirely new. It is attractively illustrated and suitable alike for export and domestic trade, although originally intended for the foreign market. One of the features is a number of sample newspaper advertisements for the retailer's use.

THE annual election of directors and officers of the Syracuse Chilled Plow Company, Syracuse, N. Y., was held January 10. The following officers were elected: C. A. Chase, president; W. W. Wiard and A. M. Chase, vice-presidents; Francis Hall, secretary; James Manning, treasurer; H. Wiard, superintendent. The directors chosen were the following: C. A. Chase, W. W. Wiard, A. M. Chase, Francis Hall, Jas. Manning, H. Wiard, A. H. Hiscock, Mrs. Emma P. Willets and T. J. Leach.

Parcels Post Bills Before Congress.

IN view of the deep interest of the Hardware trade, and especially of the retail merchants, in the question as to whether Congress shall enact a measure establishing a domestic parcels post, a brief statement of the parliamentary situation with reference to the various pending measures will be timely at this juncture, when the annual Post Office Appropriation bill is receiving the finishing touches in the Post Office Committee of the House of Representatives.

The Henry Bill.

Three bills providing for a domestic parcels post are now pending before the House committee. The best known of these measures is the Henry bill, the terms of which have recently been published, and which provide in brief for the transportation of packages up to 11 pounds in weight at the rate of 5 cents for the first pound and 2 cents for each additional pound, with the privilege of registration for an additional fee. This bill has been pending in the House for a number of years and its enactment has been urged by the so-called Postal Progress League, the principal catalogue houses and a few manufacturers in special lines who market their goods through the mails.

The Hearst Bill.

The second bill was introduced for the first time early in the present Congress by Representative W. R. Hearst of New York. While differing in phraseology, the rates and general terms of the bill are identical with those of the Henry measure, but the prominence of its author and the fact that he is the owner of a chain of newspapers have naturally given an impetus to this bill, and its enactment has been urged in a larger number of petitions received by Congress than have advocated the passage of the Henry bill.

The Denny Bill.

The third bill now pending has been introduced by Representative Denny of Maryland and is regarded as the most dangerous of the three measures from the standpoint of the opponents of this class of paternalistic legislation. It authorizes the Postmaster-General to put into operation an "experimental" parcels post service between certain Eastern cities, and "to establish rules and regulations for the carrying of parcels by the Post Office Department not to exceed 11 pounds in weight, and to charge for the same not to exceed 6 cents for 1 pound and 2 cents additional for each extra pound up to and including 11 pounds; provided, that the Postmaster-General may add an additional charge not to exceed one-half of the above for the immediate delivery of such packages to the addressee." The bill also appropriates \$100,000 to cover the expense of this experimental service for the first year.

The Question in Congress.

At the beginning of the present session two courses were open to the friends of these measures: either to seek to have one of them added as an amendment to the Post Office Appropriation bill or to induce the House committee to report one of the bills as an independent measure. The first effort was made to put one of the measures on the Post Office Appropriation bill as a "rider," but this has failed. The attempt to place this rider on the bill has been but half hearted, for the reason that it was well understood that such an amendment would be open to the point of order that it was new legislation, which can be added to an appropriation bill by unanimous consent only.

It will now be in order for the friends of these propositions to endeavor to have one of them added to the appropriation bill during the debate on its provisions in the House, but as the point of order may again be made there is little prospect for the success of such a movement. When the appropriation bill reaches the Senate Post Office Committee all these tactics will be repeated, but they will be open to substantially the same objections as in the House. Under these circumstances it is obvious that the parcels post boomers must secure sufficient

strength in the House or Senate Post Office Committee to obtain a favorable report upon one of the three bills mentioned as an independent measure, and the most promising plan is to bring out the Denny bill as a harmless "experiment," which will not commit the Government, but which will furnish an opportunity to test the proposition and thus silence either the critics or the advocates of a domestic parcels post.

This suggestion, however, is promptly met by the opponents of these schemes with a little historical sketch of the origin and growth of the rural free delivery service. Hardly more than half a dozen years ago Congress made an appropriation for an "experiment" in rural free delivery amounting to \$10,000. The sum was so small that the Postmaster General decided not to utilize it, and the following year Congress increased the amount to \$40,000. The appropriation for the current fiscal year is more than \$21,000,000, and the Postmaster General's estimate for the allotment to be carried in the appropriation bill now under consideration is nearly \$27,000,000. It is small wonder that those who have observed the development of the postal service during the past decade are suspicious of "experiments."

Parcels Post in Rural Free Delivery.

The House Post Office Committee now has under consideration a project designed by Fourth Assistant Postmaster General Bristow to offset to some extent the injurious effects of the rural free delivery upon the business of small retailers in rural communities. He proposes to permit packages up to five pounds in weight to be delivered by rural carriers at 3 cents per pound, provided they are deposited at the distributing offices from which the rural routes radiate and do not pass through any other post office or over any line of railway. This would enable retail merchants to send small articles to their customers on local rural routes at 3 cents per pound instead of 16 cents, as at present. The catalogue houses would be unable to avail themselves of this rate, and thus the small retailer would enjoy a special advantage of considerable importance. The project is a new one and is receiving very careful consideration at the hands of the Post Office Committee. General Bristow believes that if it is adopted it will put an end to the clamor for a parcels post on the part of the farmers of the country. At the same time it would net a large revenue to the Government, as the gross receipts from the service would be profit, as the carriers and their equipment are already provided.

Merchants Should Be Alert.

The campaign for the enactment of a parcels post measure of some kind will reach a crisis when the post office appropriation bill is reported, and it would be well for all merchants who are opposed to this institution to advise their Senators and Representatives of their views and to urge that all these bills be defeated. The attention of Representatives in Congress should also be called to the fact that after the appropriation bill has been passed the advocates of a domestic parcels post are likely to endeavor to secure favorable action on an independent measure in the House or Senate committee. This phase of the subject should have special attention in view of the tactics likely to be employed in the effort to bring out the Denny bill with a favorable recommendation.

WELLS BROS. COMPANY'S FOREIGN TRADE.

IN view of the rapidly increasing demand for its products from Great Britain and the Continent, Wells Bros. Company, Greenfield, Mass., has made arrangements to carry a stock of goods in London. The company has appointed Theodore Butler as its resident representative, with quarters at 149 Queen Victoria street, E. C., where a complete line of Taps and Dies and Screw Cutting Tools and Machinery will be carried in stock, the latter being increased as warranted by the demand.

HENDRICKS & CLASS, 25 West Broadway, New York, have been appointed selling agents for domestic and export by Chas. L. Ireson, 148 High street, Boston, manufacturer of high grade Leather Belting and Belt specialties.

HARDWARE ORGANIZATIONS.

The following conventions of State Retail Hardware Associations will be held during February and March:

WISCONSIN RETAIL HARDWARE ASSOCIATION:

Ninth annual meeting, February 1 and 2, Milwaukee. Headquarters, Republican House. Membership, 400; gain since last meeting, 100. President, H. L. McNamara, Janesville; secretary, C. A. Peck, Berlin.

NORTH DAKOTA RETAIL HARDWARE ASSOCIATION:

Eighth annual meeting, February 1, 2, 3, Fargo. Headquarters, Metropole Hotel. Sessions at Fargo Commercial Club. Membership, 190. President, H. F. Emery, Fargo; secretary, C. N. Barnes, Grand Forks.

NEBRASKA RETAIL HARDWARE DEALERS' ASSOCIATION:

Fourth annual meeting, February 7 and 8, Omaha. Headquarters, Millard Hotel. Membership, 200. President, J. C. Cornell, Ord; secretary, H. J. Hall, Lincoln.

IOWA RETAIL HARDWARE DEALERS' ASSOCIATION:

Seventh annual meeting, February 8, 9 and 10, Des Moines. Headquarters, Savery Hotel. Sessions at Commercial Exchange Hall. Membership, 350. President, S. R. Miles, Mason City; secretary, A. R. Sale, Mason City.

COLORADO RETAIL HARDWARE DEALERS' ASSOCIATION:

Third annual meeting, February 14 and 15, Denver. Headquarters, The Adams. Membership, 125. President, A. L. Branson, Trinidad; secretary, F. C. Moys, Boulder.

KENTUCKY RETAIL HARDWARE AND STOVE DEALERS' ASSOCIATION:

Fifth annual meeting, Louisville, February 14 and 15. President, J. C. Frederick, Owensboro; secretary, John R. Sower, Frankfort.

ILLINOIS RETAIL HARDWARE DEALERS' ASSOCIATION:

Seventh annual meeting, February 14, 15 and 16, Peoria. No official hotel headquarters. Sessions at Turner Hall. Membership, 300. President, C. H. Williams, Streator; secretary, L. D. Nish, Elgin.

PENNSYLVANIA RETAIL HARDWARE DEALERS' ASSOCIATION:

Fourth annual meeting, February 21 and 22, Harrisburg. Membership, 200; gain since last meeting, 65. President, Joseph M. Selheimer, Lewistown; secretary, J. E. Digby, McKees Rocks.

INDIANA RETAIL HARDWARE DEALERS' ASSOCIATION:

Sixth annual meeting, February 21, 22 and 23, Indianapolis. Headquarters, Denison Hotel. Membership, 425; gain since last meeting, 48. President, E. M. Bush, Evansville; secretary, M. L. Corey, Argos.

MINNESOTA RETAIL HARDWARE ASSOCIATION:

Ninth annual meeting, February 23, 24 and 25, Duluth. Headquarters, Spalding Hotel. Sessions in Lyceum Theater. Membership, 600. President, A. T. Stebbins, Rochester; secretary, M. S. Mathews, Boston Block, Minneapolis.

MISSOURI RETAIL HARDWARE AND STOVE DEALERS' ASSOCIATION:

Seventh annual meeting, February 21 and 22, St. Joseph. Membership, 160. President, Taylor Frier, Louisiana; secretary, Fred Neudorff, St. Joseph.

OHIO HARDWARE ASSOCIATION:

Eleventh annual meeting, February 28, March 1 and 2, Dayton. Headquarters, Algonquin Hotel. Membership, 325. President, John F. Baker, Dayton; secretary, Frank A. Bare, Mansfield.

NEW YORK STATE ASSOCIATION OF RETAIL HARDWARE DEALERS:

Third annual meeting, March 7, 8 and 9, Buffalo.

Headquarters and meeting at Hotel Iroquois. Membership, 175. President, John G. Ferres, Johnstown; secretary, John B. Foley, Syracuse.

NATIONAL RETAIL HARDWARE DEALERS' ASSOCIATION: Minneapolis, Minn., March 14, 15 and 16.

NEW ENGLAND RETAIL HARDWARE DEALERS' ASSOCIATION:

Twelfth annual meeting, March 15 and 16, Boston. President, John H. Sayward, Haverhill; secretary, F. Alexander Chandler, 36 Federal street, Boston.

Ohio Hardware Association.

With a view to making the Question Box feature of the coming annual meeting of the Ohio Hardware Association as interesting and instructive as possible, Frank A. Bare, secretary, Mansfield, Ohio, has issued a blank in which merchants are invited to note topics or questions which they would like to have discussed at the convention. This blank has been sent to every merchant in the State, whether a member or not. The questions thus drawn out will be put in the Question Box at the meeting without the name or address of the party responsible for them. In this way it is hoped to bring before those present matters of a timely and interesting character. The convention will be held at the Algonquin Hotel, Dayton, February 28, March 1 and 2, and arrangements are making for an unusually large and representative gathering of the trade.

The following circular letter from the secretary was sent out under date 14th inst.:

The Hardwaremen of to-day find themselves confronted by many serious problems. They realize that these questions can never be solved in individual effort. The association offers the opportunity for the united action necessary to success.

The National Association has grown to be an influential body of the highest order. The Ohio dealer appreciates this fact.

The secretary recently mailed to all Hardware dealers in the State blanks asking for questions for the Question Box. Every mail brings responses to this request. The number and the character of these questions prove that the Ohio dealer is aware of the fact that he may profit by the experience of his fellow dealers through discussion in the convention.

President Baker has given great care and thought to the selection of a committee of capable men, who will have charge of the Question Box.

Our next convention will be an educational one. S. Norvell, who has been so prominently before retail Hardware dealers during the past year, will give an address entitled "Brands of Experience." A. F. Sheldon of Chicago will deliver an inspiring lecture on "Scientific Salesmanship." W. P. Bogardus, president, and M. L. Corey, secretary, of the National Association, will be with us during the entire session and in a number of informal talks will tell us something of the great things the National Association is doing. These gentlemen are both forceful, entertaining speakers, and are rich in their experiences, gathered in attending many Hardware conventions. We are making an effort to secure other noted speakers.

The entertainment feature has not been overlooked. The Dayton Committee has some good things in store. The National Cash Register people, famous for doing things just right, will entertain us one evening.

Applications for membership are coming in every day. The increased interest in association work is indicated by the large number of old and new members who are planning to attend this convention, and we predict that the coming session will be one of the greatest interest and profit to the Hardware dealers of Ohio.

New England Iron and Hardware Association.

The annual dinner of the New England Iron and Hardware Association will be held at the Hotel Vendome, Boston, on Tuesday evening, January 24. A reception will precede the dinner. The special guests of the association will be Hon. Swager Sherley of Louisville, Ky.; Hon. R. P. Campbell of Kansas, Gov. William L. Douglas and Lieut.-Gov. Curtis Guild, Jr., of Massachusetts; Gen. Nelson A. Miles, Mayor Patrick A. Collins of Boston, President Elliot of Harvard University, President Prichard of Massachusetts Institute of Technology, Lucius Tuttle, president of the Boston & Maine Railroad; Rev. Paul Revere Frothingham, Edward B. Wilson, president of the Boston Associated Board of Trade; Charles E. Adams, president of the Massachusetts State Board of Trade, and J. H. Sayward, president of the New England Hardware Dealers' Association.

The Committee of Arrangements, John T. Boyd of Yale & Towne Mfg. Company, chairman, has planned the banquet on a very elaborate scale. R. M. Boutwell, chairman of the Reception Committee, will have as his assistants the following: P. T. Burke, George P. Dexter, Harry L. Doten, Charles F. Dowse, William P. Hill, Wilbur Sargent Locke, John H. Robbins, Oscar A. Shepard, Harry W. Waite.

Iowa Retail Hardware Dealers' Association.

In the souvenir programme for the seventh annual convention of the Iowa Retail Hardware Dealers' Association, which will be held at Des Moines February 8, 9 and 10, the "objects of the association" are admirably set forth as follows:

1. To identify you with the progressive Hardwaremen of Iowa.
2. To place you in touch with the up to date dealers in other States through the National Association.
3. To bring together the Hardware people of Iowa that we may have their combined help, experience and knowledge in forming plans and carrying them out for our mutual protection and benefit.
4. To place the business of the retail Hardware dealer upon a basis that will help him to meet the changed conditions of business life and remove illegitimate competition.
5. To unite our efforts in securing necessary State and national legislation to protect honest dealers from dishonest methods, and prevent hostile legislation.
6. To co-operate with other State and National Associations that are working to the same ends and purposes.

Among the papers to be read at the meeting are the following:

- "Why I Am a Member of the Iowa Retail Hardware Dealers' Association," by B. A. Hand, Ottumwa.
- "The Catalogue House Question," by S. Norvell, St. Louis, chairman Wholesale and Retail Joint Committee.
- "Mutual Insurance," by B. F. Carroll, State Auditor.
- "Hardware Mutual Insurance," by C. F. Ladner, president of the Retail Hardware Dealers' Mutual Fire Insurance Company of Minnesota.
- "Some Suggestions as to How a Retail Hardware Dealer May Increase His Business and Profits," by F. H. Luthe, Des Moines.
- "Hints for Stock Taking," by L. Lindenberg, Dubuque.
- "Some of the Important Problems of the Retail Trade Other Than Catalogue House Competition," by J. H. Petty, Elliott.

Another feature of the programme will be a discussion on the question "Can the Services of the Traveling Salesman Be Dispensed With to the Mutual Advantage of Buyer and Seller."

Under the head of the Question Box the following live topics will come up for consideration:

- What are the benefits received from discounting bills?
- How much do personal magnetism and courtesy to customers increase sales?
- Should the retailer patronize jobbers who supply goods direct to customers of the retailer?
- How can we prevent the selling to consumers by jobbers?
- Does it pay to encourage the jobber with your business?
- How can we eliminate the ruinous competition brought about by farmers' telephone lines bringing into competition the dealers in neighboring towns?
- What means can be adopted to bring neighboring Hardware dealers to a mutual understanding that will insure a living profit and create a better fellow feeling?
- How should we meet farmers' associations and alliances in order to get the farmer's trade?
- How can we best control merchants in other lines who order Hardware supplies and turn them over to their customers at cost?
- Why should we become better acquainted with our neighboring retail Hardware firms?
- What is the best way to meet the competition of general merchants who have bargain counters of Tinware, Cutlery and other articles of Hardware and sell them at cost in order to draw trade?
- What is the best way to keep grocery stores and lumber companies from selling such articles as Screen Wire, Tinware and other seasonable articles that belong to the Hardware trade?
- Are there not too many traveling salesmen for the economical distribution of Hardware and for the good of the people in general?
- Why would it not be a good idea to take off the traveling salesmen and let the jobbers sell the retailers direct?
- How can we prevent the traveling men selling to factories, and also selling Lawn Mowers, Hose and other goods of that class to merchants in other lines?
- Is it possible to conduct a Hardware store successfully on a cash basis?
- Can a strictly Hardware business succeed under the present conditions of trade, or should we add side lines in order to make a success?
- Why cannot the dealers in each town establish an association price when they buy goods that are sold on association prices? Should not the convention take action in this matter?
- Is it advisable to organize retail Hardware dealers into county associations?
- Why cannot the local merchants organize an association for the purpose of rating customers and assisting in the matter of collections? If such organization are in existence, what are the plans and the success of the same?
- What is the best means of advertising in a small country town that has no local newspaper?
- Are not the expenses of running a retail Hardware business more than the average merchant figures on, and do we properly consider the large number of articles sold on a narrow margin of profit and goods on which we have no choice when we are marking the general stock?
- If your competitor cuts prices on goods that he has not in

stock is it policy to loan him these goods until he can get a shipment of the same?

What is the best way to sell Wire Cloth—by the square foot, running yard or by the pound?

Is it not a fact that the present price of Stoves is too high?

The Hardwareman's advertising.

The headquarters of the association will be at the Savery Hotel, while the sessions will be held in the Commercial Exchange Hall. A railroad rate of a fare and a third for the round trip on the certificate plan has been secured.

Wisconsin Retail Hardware Association.

The programme for the convention of the Wisconsin Hardware Association calls for a two-day meeting on February 1 and 2 in Milwaukee, the headquarters being at the Republican House, where the sessions will also be held. The arrangements made promise an entertaining and instructive meeting. This association has expanded materially during the past year and boasts of a membership of nearly 400 representative merchants, as compared with 300 at the last annual meeting—a handsome and gratifying gain. Accompanying the programme is a leaflet addressed to the Hardwaremen of the State calling their attention to the association and its coming meeting and making a strong appeal for their attendance and co-operation.

Philadelphia Hardware Merchants' and Manufacturers' Association.

At a meeting of the Hardware Merchants' and Manufacturers' Association of Philadelphia held on the 17th inst. the following officers were elected for the ensuing year: President, Thomas Devlin; vice-president, John R. Griffith; secretary-treasurer, T. James Fernley. The following Board of Directors was chosen: Thomas Devlin, William W. Supplee, Samuel Disston, James H. Ritter, C. C. Tryon, John R. Griffith, Ellicott Fisher, E. S. Jackson, T. James Fernley.

OSWALD MUELLER, a former resident of Lebanon, Ill., died at his home in Abilene, Texas, January 3. Mr. Mueller was born in Madison County, near St. Jacob, Ill., May 26, 1854. After some years spent in the milling business Mr. Mueller in 1885 entered the Hardware business at Glasgow, Ky., with his brother, J. Christian Mueller, since deceased, and nephew, J. C. Bold, under the firm name of Mueller & Bold. In 1889 the business was disposed of to Wood & Bybee, Mr. Mueller later buying back an interest in the firm. Later he became associated with Clarence Wood, the firm being known as Wood & Mueller. In 1897 Mr. Mueller moved to Texas and became identified with Henry Brown in the Hardware business at Abilene, purchasing his partner's share of the business a year later. In March, 1903, he gave his son, John J. Mueller, an interest in the business, the firm becoming O. Mueller & Son.

Miller & Co., Sherwood, Ohio, on account of the presence of several firms in that place with Miller as a part of the style, have decided to change the name of their business to Sherwood Hardware Company. The proprietors, Johnson Miller and C. H. Dunakin, stand in the same relation to the new firm as the old.

R. F. Dillard and H. H. Seay have purchased of P. E. and J. M. Harris their entire holdings in the Harris-Dillard Hardware Company, Blackstone, Va. The new corporate name will be Seay-Dillard Hardware Company. Mr. Dillard, who has been identified with the business since its establishment more than 20 years, becomes president, and Mr. Seay, a stockholder since its incorporation, becomes secretary and treasurer.

Charles W. Hallett, 127 Fulton avenue, Astoria, Long Island, N. Y., after over 50 years' active connection with the Hardware line, has retired and will be succeeded in the prosperous business which he established by his son, Frederick T. Hallett.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

POINTERS FOR THE HARDWAREMAN.

BY ON-THE-ROAD.

TALKING with a hustling merchant not long since, he remarked that goods displayed in front of the store, with price cards on them, attracted a good deal of attention. He had found, indeed, that the sidewalk display was frequently more of a trade winner than the show window. It caught the eye of the farmer passing by in his wagon more quickly than the window exhibition. He had sold many goods as a result of displaying stock on his sidewalk that whetted the farmer's desire for possession.

Many Hardware merchants would secure better effect in their window displays if more care were taken in making the articles "stand out" to "Stand Out" the eye of the passer by. An article the Display posed on a pedestal of some kind is always more conspicuous than the same article placed on the window floor. A common flower pot provides a good pedestal. It may be covered with colored tissue paper, crepe paper, tin foil, bunting, whatever is most appropriate for the article or articles displayed.

Preserve catalogues of goods more or less kin to your lines but which you do not find it feasible to carry regularly in stock. See that the catalogues are filed and indexed (as to character of goods covered) so that access to them may be quickly made when a sale is Not in Stock possible. The sale of such articles is often attended with a good profit, while the store proprietor is making a valuable reputation for his establishment and promoting the disposal of other goods which are regularly handled.

One of my Western customers recently had what he termed a "rock bottom sale." Announcement was made through the advertising columns of the local papers and by means of circulars distributed through the mails and otherwise that for this sale, which continued through several days, prices would be materially marked down on a large variety of goods. In his single show window he arranged a pile of stones,

A "Rock Bottom" Sale at the summit of which was a sign with the following inscription effectively brought out:

**MY ANNUAL
ROCK BOTTOM SALE
NOW ON.**

**PRICES
WILL
INTEREST
YOU.**

This stone pile occupied the center of the window, the remainder of the floor of which, together with the sides and back, bore selections from the merchant's stock neatly and attractively arranged, with prices.

A small pebble glued to one of the corners was a feature of the circulars distributed by this merchant.

I find that color schemes in connection with special sales are coming into favor. Let the color chosen prevail in everything identified with the Color in Special Sales sale—circulars, handbills, signs, price tickets, wrapping paper, twine, decorations, if any, &c. The delivery wagon and its horse power should also carry the distinguishing color.

A dealer in the West recently completed his fifth year in the Hardware business. To signalize the event he announced a "Wooden Anniversary" sale. The customers on the day designated were given their choice of a variety of useful wooden articles, such as Towel Racks, Wooden Bowls, Potato Mashers, &c.

Several of my customers from time to time run advertisements in the local papers which are presented in a form adapted to circular use without any typographical modification. The printer is directed to strike off any desired number of circulars, thus saving the expense of setting type. One merchant makes a specialty of combining two successive ads in a circular, the publisher being instructed to hold the first ad in type until the second appears, when the matter in the two announcements is issued in circular form. This he regards as a very advantageous sort of advertising. I also encounter stores here and there in which reproductions of their current advertisements are posted at various points throughout the store. This permits ready reference to the ads by clerk or customer.

While on the subject of newspaper advertising, I am reminded of a merchant in the East who made an arrangement with the publisher of the local newspaper by which in consideration of defraying the cost of the paper needed for a certain issue the merchant was permitted to choose paper of a distinctive color. Pink was the chosen color, and one day the people of **A Local Sensation** the town were stunned at the appearance of their favorite paper in a new dress. An explanation for the strange departure from the conventional was given in the editorial column. Of course the ingenious merchant had a large ad in the paper, and he was the subject of a good deal of talk by his patrons and others.

A MERRY CHRISTMAS.

FOR many years at the Christmas season a well-known jobbing house has followed the plan of stamping its invoices, envelopes, letters, &c., in the manner reproduced herewith. This graceful and considerate custom is carried out not only in connection with customers, but with all with whom the house comes in contact in a business

Wishing you a—

** * Merry Christmas **

way, whether as buyers or sellers. Another stamp, similar in style to the above, bears the inscription "Wishing You a Happy and Prosperous New Year."

CALENDARS, ETC.

FALLS HOLLOW STAY BOLT COMPANY, Cuyahoga Falls, Ohio: Pictorial monthly hanger calendar.

ASPHALT READY ROOFING COMPANY, 136 Water street, New York: Hanger calendar with large monthly sheets.

BOEBINGER HARDWARE COMPANY, Cincinnati, Ohio: Monthly hanger calendar.

STERLING EMERY WHEEL MFG. COMPANY, Tiffin, Ohio: New Year's greeting card.

SILVER & Co., 304 Hewes street, Brooklyn, N. Y.: Celluloid vest pocket calendar.

H. F. HERTZOG, Reading, Pa.: Calendar and memorandum book.

NORTHWESTERN MALLEABLE IRON COMPANY, Milwaukee, Wis.: Attractive folder, with the season's greetings.

IVER JOHNSON'S ARMS & CYCLE WORKS, Fitchburg, Mass.: Large pictorial monthly hanger calendar.

STANDARD TOOL COMPANY, Cleveland, Ohio: Monthly hanger calendar.

IRWIN AUGER BIT COMPANY, Wilmington, Ohio: Pictorial monthly hanger calendar.

TRADE ITEMS.

W. T. O'BRIEN has been appointed manager of the New York branch, 21 Cliff street, of Sidney Shepard & Co., Buffalo, N. Y., manufacturers of large assortments of Kitchen and Household Utensils in the various metals, enameled, galvanized and japanned wares, &c. Mr. O'Brien succeeds Sidney Dettmers, who grew up commercially at headquarters in Buffalo and who has now returned there, Mr. O'Brien having in the past been his assistant in New York.

At the annual meeting of the Supplee Hardware Company, Philadelphia, Pa., the old Board of Directors and officers were re-elected. It was also decided to increase the Board of Directors from seven to eight, and James S. Bonbright, who has charge of the Lawn Mower business of the company, was elected as the additional director.

GEO. A. BUSHNELL, who established a Hardware purchasing agency in Chicago, has sold that business to a firm in another city and has returned to Denver, Col., where he has allied himself with McPhee & McGinnity Company, a large Hardware and lumber firm.

PARKER WIRE GOODS COMPANY, Worcester, Mass., is now making the line of Automatic Blind Hinges, &c., formerly manufactured by Hale & Benjamin, Greenfield, Mass. The Parker Company has secured the exclusive right to manufacture and sell these goods and is in a position to fill orders promptly.

THE NATIONAL SCREW & TACK COMPANY, Cleveland, Ohio, has purchased the Cotter business of the Standard Tool Company of that city, including machinery, stock, good will, &c. With the excellent facilities thus acquired, which will probably be further improved, the company will be in position to fill orders promptly for Spring Cotters, Flat Spring Keys and Riveted Keys.

UNDER date 7 inst. announcement is made that the Novelty Mfg. Company, Jackson, Mich., has disposed of its entire business, including real estate, plant, machinery, good will, &c., to the Metal Stamping Company. The new company will be conducted by those who have successfully managed the affairs of the old company for the past 15 years.

THE business acquaintances and personal friends of J. D. Cox of the Cleveland Twist Drill Company, Cleveland, Ohio, will be pleased to know that after a continuous service in the business which he established in 1874, he has determined to share with younger men many of the cares and responsibilities incidental to what has become a large and prosperous concern, whose product is well known in both domestic and foreign markets. With this in view, the business was incorporated December 31, 1904, Mr. Cox retaining his large financial interest and becoming vice-president and a director of the new company, the changed conditions permitting him to give more time to needed rest and recreation. The other officers of the company are F. F. Prentiss, president and general manager; E. G. Buckwell, secretary, and George F. Kast, treasurer. The personnel of the business is unchanged and the same broad principles which have controlled in the production and marketing of the goods will be maintained in the future.

HARLAN P. DUNCAN, for more than half a century identified with the retail Hardware business and for a long period president and general manager of the Duncan-Goodell Company, Worcester, Mass., has resigned his offices because of poor health. Mr. Duncan entered the employ of C. Foster & Co. October 1, 1854. The firm entered the present store of the Duncan-Goodell Company the next year. In 1866 Mr. Duncan and John B. Goodell bought out the interest of one of the partners. In 1887 the business was incorporated, being the first mercantile establishment in Massachusetts to take advantage of the corporation laws, it is said. Mr. Goodell still has an active part in the management of the business, associated with him being Foster Goodwin, Brigham M. Scott and H. W. Chamberlain. Mr. Duncan retains his financial interest in the corporation.

JOHN A. GREGG, Burlington, Iowa, representative of manufacturers to the jobbing trade, has issued his 1905 booklet containing a list of his clients and their products. Provision is made in it for memoranda, and it is hoped that it will prove of value both to the buyer and stock clerk for reference. Among the manufacturers represented by Mr. Gregg are the Adams Company, Irwin Auger Bit Company, Benbow-Brammer Mfg. Company, O. P. Schriver & Co., F. D. Kees, Weber-Kirch Mfg. Company, Abingdon Trap Company, Warren Axe & Tool Company, Hay-Budden Mfg. Company, E. D. Clapp Mfg. Company and C. S. Smith Mfg. Company.

OWING to the fact that a number of the manufacturers in Janesville, Wis., are using "Rock River" in their firm or corporate names, the Rock River Hay Tool Company has deemed it advisable to change its style and will hereafter be known as the Strickler Hay Tool Company. No other change has taken place and F. B. Strickler, the original patentee of the Strickler Hay Carrier, will continue to manage the business. Hereafter the company's Hay Carriers will be painted red instead of green and will also bear the name Strickler, so that the company's product may be easily recognized.

THE SIMMONS HARDWARE COMPANY.

SIMMONS HARDWARE COMPANY, St. Louis, has purchased the entire stock of the Baker Hardware Company at Sioux City, Iowa. The business will be continued under the old style for the present. It is the intention of the company to make the service of the trade from Sioux City equal to any that has been given by any jobbing house.

Indications of the broadening enterprise of the Simmons Hardware Company are also given in the daily papers, in which under date of January 13 there is anouncement of the incorporation in New York State of the Simmons Hardware Company of New York, with a capital of \$1,000,000, the directors being Edward C. Simmons, Samuel F. Pryor of St. Louis and Morris U. Ely of New York. This is naturally regarded in connection with the recent close alliance of the company with Neal & Brinker, 18 Warren street, New York, and the opening of an office of the company at 298 Broadway, prominence being given in both of these establishments to its Keen Kutter goods and other specialties.

It is apparently the intention of the company to strengthen itself in various directions and to take in the market hereafter even a larger place than it has ever occupied. The steps taken in the carrying out of this project will be regarded with especial interest in view of the company's high standing in the trade, its unsurpassed ability in organization, its close contact with trade conditions and tendencies, and its readiness to adopt the most approved and up to date methods.

THE WRIGLEY HARDWARE COMPANY, Mahaffey, Pa., has just been reorganized and application has been made for a charter to incorporate under the name of the Wrigley Company, with capital of \$50,000. The president is Miles Wrigley; treasurer and secretary, G. E. Conroth, and the directors, Miles Wrigley, E. M. Binder, F. H. Markle and H. P. Galer.

ARTHUR J. BAXTER has disposed of his business at Neosho Falls, Kan., to O. H. Edwards, who continues at the old stand.

G. H. PERRY, of Cuthbert, Ga., has recently opened up in business, handling Stoves and Tinware, Shelf and Heavy Hardware, Farming Implements, &c.

UP to June last the Punxsutawney Hardware Company, Punxsutawney, Pa., did a retail business exclusively. At that time it added a wholesale department. This has been attended with so much success that an extension of its facilities in the near future is contemplated.

FOREIGN TRADE.

AUSTRALIAN NOTES.
FROM A SPECIAL CORRESPONDENT.

MELBOURNE December 9, 1904.

The Hardware trade during the month of November has produced no new features. Harvesting Machinery is simply booming, as the wheat outlook on all hands is more than excellent. Last year was the Victorian record, but this season bids fair to eclipse last year's figures. The American Farm Implement firms on every side are having a particularly rosy time, but it is not anticipated that they will in the future have such a complete run of the markets as they are now enjoying. A movement is gathering force on every hand for the imposition of heavier protective duties, more especially with regard to Agricultural Implements. American houses may possibly secure the bulk of the trade, even with added duties, but, though successful in this direction, present profits must be largely cut down. A new tariff commission is being appointed even now, and there is not the slightest doubt that their recommendations will carry added weight this time. Nevertheless, it will be gratifying to your countrymen to know that the D. M. Osborne Company is commencing to build a huge warehouse in Melbourne; so it, at any rate, has no fear regarding the future outlook in this market. Additional land is being put under cultivation, and this, of course, must mean an increase in Farm Implement requirements. Local manufacturers of these lines with one or two exceptions are having a bad time, and many of their employees are loafing in the streets. The protectionist part of the community will hang a real big hat on the effect of the duties on Agricultural Implements.

The building trade throughout the various States is going ahead steadily, both as regards public and private enterprise. Builders' Hardware is consequently having a good time, although it is noticeable that the American manufacturer is not so closely to the front as was the case some few years ago.

Nineteen hundred and five, just now so close upon us, should be a fairly prosperous year to Australia generally. There is little doubt that all outstanding paper not taken up after the last harvest will assuredly be met within the next few months. While the year is not likely to show any material increase in trade, owing to the lack of population, &c., still there is no doubt that trading accounts will be met with promptness and trading operations generally be on a more satisfactory footing than has been the case during our past seven years of trouble.

IRON BEDSTEADS FOR ASIA MINOR.

Some time ago an enterprising firm in Birmingham, England, sent an experienced agent into Asia Minor who succeeded in obtaining orders for no less than 5000 Iron Bedsteads, most of which were shipped to Beyrouth, while a few went to Latakia and other ports. These were not Camp Bedsteads, but good, solid Single and Double Bedsteads, for which on an average about \$12.50 each was paid. Since that time the trade has rapidly increased until now it amounts, we are assured, to something like 10,000 Bedsteads per annum. The American share in this trade has hitherto been so small that it is deemed timely to call attention to it. While it is true that the activity of our home trade has been so great as to largely occupy the attention of our merchants, on the other hand the successful maintenance of trade demands continual vigilance and some enterprise. Unless we are quick to fill every gap which appears in the line of genuine commercial adventure there is danger that somebody else will fill it, and so effectually as to keep us out when it may become useful for working off our surplus stock.

The ordinary British Iron Bedstead is an antiquated thing, provided with sheet iron straps, upon which the mattress is laid. These straps are fastened by an oval button, which is turned with a key. In case this key is lost the Bedstead can neither be set up nor taken down, while at the best it is a bed of torture, its only recom-

mendation being its superior cleanliness. This is what makes it popular in all warm climates. But the American Iron Bedstead is so superior to its British cousin that it needs only to be shown to be preferred.

DRUMMERS WHO MERELY DRUM.

BY DELMOUR.

There is a class of drummers who command respectable salaries and yet who miss a good deal of trade, everything, in short, that lies outside of or fails to square with their conventional lines. The reason which has been assigned for this is that they are more anxious to keep their old trade than to seek new. But this hardly seems to be a correct explanation. The real reason why they stick to regular lines is possibly lack of that knowledge of the line of goods and the mode of manufacturing some of them as would enable the salesman to correctly estimate the cost of deviating from the standard. For example, a traveling agent is showing a line of ivory handled Carvers to the buyer of a large jobbing or exporting house. One of the Carvers, with a peculiar bolster, strikes the purchaser favorably, but it has a 4-inch handle with a brass rivet. Now, what his trade demands is the same blade and bolster, but with a 5-inch handle and no rivet—the same as another cutler manufactures, who, however, adds to it an objectionable bolster.

To make a price that will leave a fair margin of profit and yet which will not depart too widely from the other manufacturer's price the salesman must be familiar with the cost of ivory, to say nothing of the brass rivet and the tang. Well, in the majority of cases, he knows nothing about these details, and so loses his customer. He may be a noted "hustler," but it is not always the hustler who catches the most new trade or who brings the greatest profit into the till.

The traveling agent who knows only how to sell but is ignorant of the details of manufacture is not only apt to lose some customers, but he also loses the opportunity of trying out suggested improvements in his goods which may make or unmake his future trade or that of the house he represents.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses and are referred to the manufacturers:

FROM J. C. SIMPSON, Kinsley, Kan., who has lately commenced business in Shelf and Heavy Hardware, Stoves, Implements, Paints, Sporting Goods, &c.

FROM MOWERY & LEWIS, Hillsboro, Iowa, who have succeeded B. M. Eastburn & Son in the Hardware, Stove, Implement, Paint and Sporting Goods business.

FROM SHELBY SUPPLY COMPANY, Shelby, Iowa, which has succeeded O. W. Jones in Hardware, Implements, Stoves, Paints, Sporting Goods, &c.

FROM G. C. DOM SUPPLY COMPANY, 7 East Pearl street, Cincinnati, Ohio, which has just been organized and will cater especially to buyers of Brass and Copper Goods, Tin Foil, Zinc and, Metals, Iron and Steel products and specialties in wood. Mr. Dom has been associated with the C. W. Evans Steel & Iron Company for the past

FROM MELVIN TILLEY HARDWARE COMPANY, wholesale and retail, Wellston, Ohio, which will soon be moving into a new building especially designed for the Hardware business.

FROM WELD HARDWARE COMPANY, Sioux City, Iowa, dealer in Hardware, Stoves, House Furnishing Goods, Furnaces, Sporting Goods, &c.

FROM W. I. SCHMITZ, Meyer, Iowa, who requests catalogues relating to General Hardware and Paints. Mr. Schmitz is a dealer in general merchandise.

FROM I. R. SPECK, Fairfield, Iowa, successor to Speck & Pattison in the Shelf Hardware, Stove and Sporting Goods business.

The New Hardware Store of Hammacher, Schlemmer & Co.

THIRD ARTICLE.

Rack for Wire.

The location of the Wire Rack illustrated in Fig. 29 is indicated in Fig. 2. This is an orderly and convenient method of carrying what is usually a troublesome stock. The different wires are carried in the following assortment of packages: Annealed Wire, in coils and stones; Stone Wire, in stones, and the same sizes on one-pound spools; Brass and Copper Wire, from No. 1 to No. 15 in coils; above No. 15, on one pound and half pound spools. Bright Iron Wire is carried in coils from No. 0 to No. 15. The coils weigh 50 pounds each and are

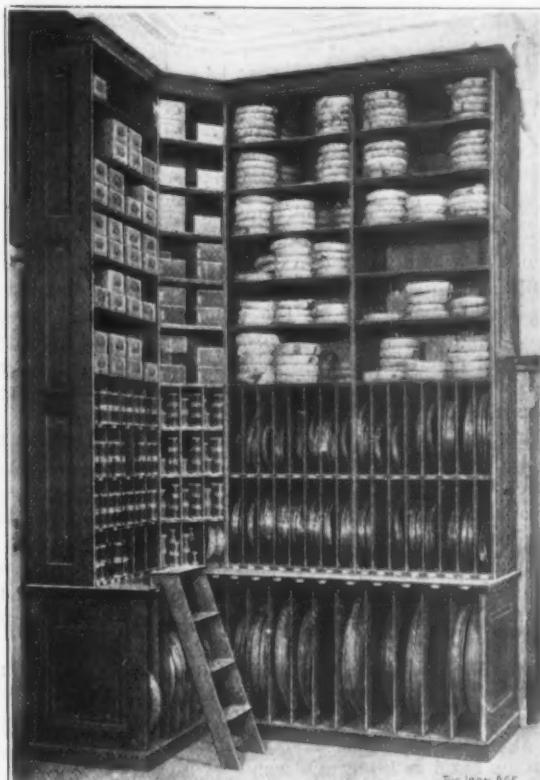


Fig. 29.—Wire Rack.

divided into five-pound packages. From No. 16 to No. 36 Bright Iron Wire is carried in stones and on spools.

The location of the Sheet Metal rack is designated in Fig. 2, the lower portion of which is arranged for Wire the same as the rack in Fig. 29. The upper portion is supplied with shelves on which is carried Strap and Hoop Brass and German Silver, Emery, sample Electric Batteries, Electric Bell Sets, &c.

Builders' Art Hardware Sample Room.

A view of the Builders' Art Hardware sample room is given in Fig. 30. This is provided with table and chairs,



Fig. 30.—Builders' Art Hardware Sample Room.

where samples may be inspected and compared at leisure. Samples on panels are kept in the tall showcase on the left, under which are drawers containing sample boards of various woods, sampled with goods in finishes and styles that best harmonize with the different kinds of wood. These boards can be taken from the drawers for inspection. Only the finer class of goods is sampled here—those that are not sampled in showcases in the Hardware department.

Pneumatic Tube Exchange.

The pneumatic tube exchange, so designated in Fig. 2, is located on the east side of the retail department, and is shown in Fig. 31. This is presided over by

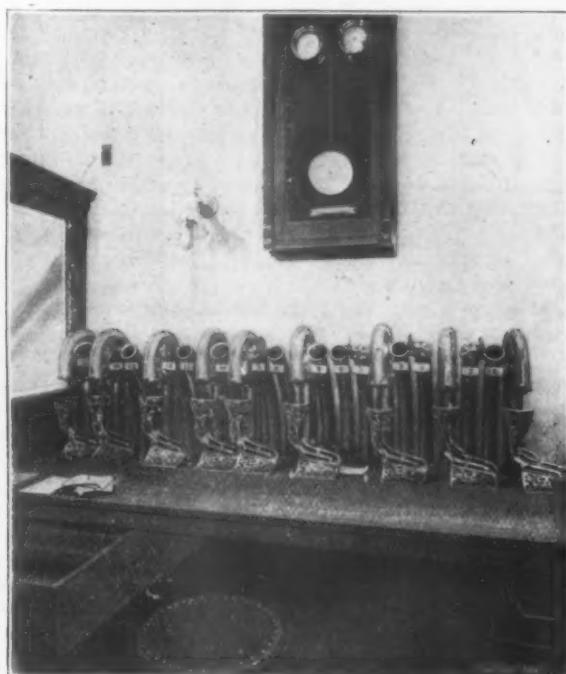


Fig. 31.—Pneumatic Tube Exchange.

a cashier and connects with 15 stations throughout the building, six of which are in the retail department. One of these stations is on the counter of the Hardware department (Fig. 32); another one, in the Cabinet Hard-



Fig. 32.—Tube Station and Dumb Waiter in Hardware Department.

ware Section, is shown in Fig. 33. The cups used in the pneumatic service are of two kinds, as shown in Fig. 34. The one to the left of the cut is for transmitting cash and

has a metal body which closes and felt ends. All cups have the number of the station to which they belong on the side. It will be seen that both of the cups shown in Fig. 34 belong to station 3, the numbers indicating to which station the cups are to be returned from the exchange. Cash cups belonging at stations which are used

various floors for goods which are not kept in stock in the retail department, either for goods sold to customers for which they are waiting or for replenishing the drawers. Order blanks for this purpose, one of which is shown in Fig. 35, are provided in pink and white colors.

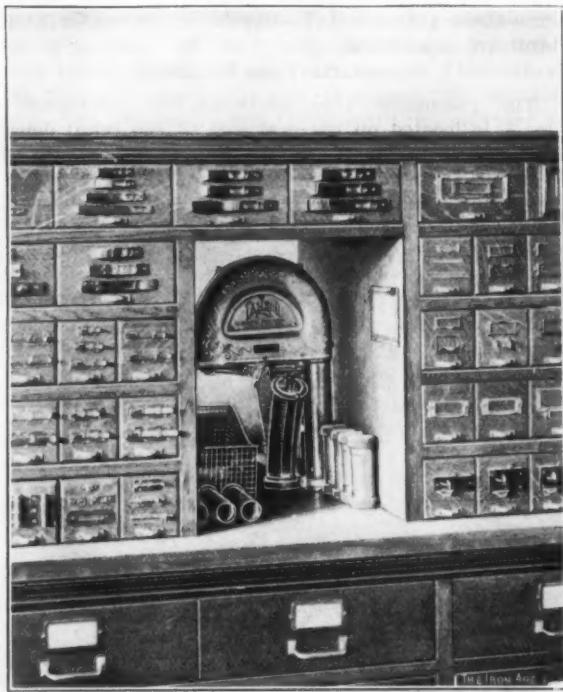


Fig. 33.—Tube Station in Cabinet Hardware Section.

by salesmen on both sides of shelving, as in the Cabinet Hardware section (Fig. 33), have different colored felt ends, red for salesmen on the north side and gray for those on the south side of the shelving. When a cup drops into the wire basket under the tube the salesmen instantly know on which side of the shelving it belongs.

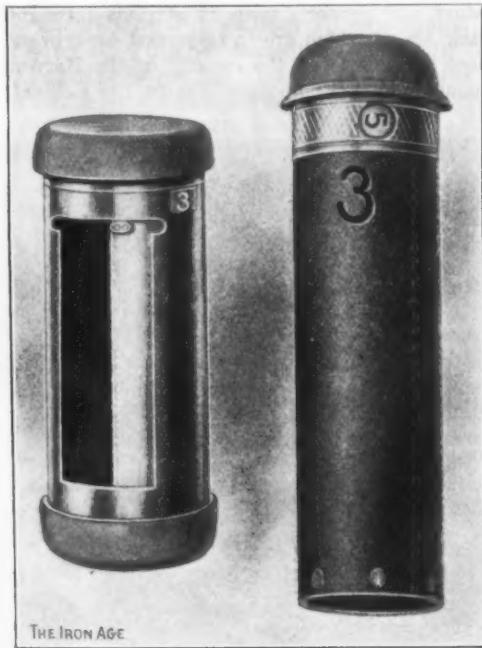


Fig. 34.—Pneumatic Tube Cups.

The cup at the right in Fig. 34 is of different construction, having one open end, and at the other end a revolving brass band with a $\frac{1}{2}$ -inch hole in it. On the metal surface underneath the band numbers are stamped from 1 to 15. The band is turned to expose No. 5, in Fig. 34, showing to which floor the cup is to be sent from the exchange. These cups are used for sending orders to the

4	FLOOR Please Send Down to Salesman No 21
<i>1/2 d Cup Catches 3041</i>	
REMARKS (Not to be used by stock clerks only)	

Fig. 35.—Order Blank.

An order on a pink blank indicates that goods ordered are to be returned to the Hardware department by the dumbwaiter on the north side of the retail department, while a white blank shows that goods are to be sent to the Tool department by the dumbwaiter on the south side. Should, for instance, a customer who is buying in the Tool department want screws, which are considered Hardware goods, and the stock of which is on an upper floor, the Tool salesman would use a white blank in ordering them, so that the Screws would come down on the Tool department dumbwaiter. Stockmen do not know which particular salesman has sent up an order, so no favoritism can be shown in giving preference by getting out one order before another. The order blank in Fig. 35 is made out by salesman No. 21, ordering Cupboard Catches from floor No. 4. The space at the bottom of the blank is for stock clerks to state what goods, if any, they are short of. The order is put in the cup and sent by tube to the exchange, where it is immediately transferred by the cashier to the tube connecting with the floor to which the order is to go. If all the goods required are in stock on the upper floor the stockman turns the revolving band to blank and sends it in the tube to the exchange, where the cashier returns it to the station to which it belongs in the retail department, as indicated by the number on the cup. If, however, some of the goods are short, the stockman holds the cup, notes the shortage on the lower part of the blank, and sends the cup, order and such goods as he may have in stock down on the dumbwaiter. A boy is stationed at each dumbwaiter to hand the goods coming down to the salesman whose number is on the order. The order is always returned with goods.

The entire transaction of getting goods from the stock floors is carried on without calling or other noise and without friction of any kind. The written order is also more reliable than if given through a tube. Should the stock clerks or salesmen find it necessary to communicate with each other after an order has been sent it is done by telephone.

(To be continued.)

THE A. C. RULOFSON COMPANY, Crossley Building, San Francisco, Cal., has been organized and will conduct a manufacturers' agency business in Iron and Steel products and specialties with the jobbing trade exclusively. Among the interests which the company is now representing are the Union Steel Screw Company, Davis Store Single Tube Transmission Company, Edwards Mfg. Company and Pacific Single Stave Barrel Company. Mr. Rulofson has been for many years prominently identified with jobbing interests on the Pacific Coast and will have the best wishes of many friends in his new departure.

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SIMONDS MFG. COMPANY'S NEW BUILDING.

THE dedication on the 6th inst. of the new building recently completed for the Simonds Mfg. Company, Fitchburg, Mass., was an interesting event. About 900 persons were present, including stockholders, officials of the company, sales agents, office employees, skilled mechanics and laborers. The special features of the celebration were a vaudeville entertainment, dancing and a banquet. A souvenir programme of artistic design presented a portrait of Daniel Simonds, president of the company, vaudeville programme, banquet menu, dance order and lists of the numerous committees having to do with the different features of the occasion.

This industry virtually had its inception in 1832, when Abel Simonds began the manufacture of Scythes and Edge Tools in West Fitchburg. The business passed to his sons, A. A. and George F. Simonds, in 1864, and they formed the copartnership of Simonds Bros. & Co., Benjamin Snow being a silent partner. Four years later the company was incorporated under the name of the Simonds Mfg. Company, and moved to its present Main street location. The floor space then occupied was 20,000 square feet, and the old building is still being used. Frequent additions to the parent shop increased the floor space and capacity, and now the buildings of the company in Fitchburg cover an area of nearly 3 acres.

In 1892 the company established a large branch factory for the manufacture of Saws and Knives in Chicago, and in 1900 it began the manufacture of its own steel at Chicago, and to-day more men are employed at the Chicago works than in Fitchburg. Departments for the manufacture of Hand Saws were established in both factories in 1900. In the infancy of the business Scythes and Edge Tools were the only products, and later Mower and Reaper sections and Planer and Molding Knives were added. Circular Saws were first manufactured in 1876, then came departments for producing Cross Cut Saws, Band Saws and Hand Saws. In 1878, when Western manufacturers of Mower and Reaper sections and Scythes combined, the new company bought the business of these departments of the Simonds Mfg. Company, and since then the Simonds Corporation has confined its attention to Saws and Machine Knives of every description.

The new building is a three-story brick structure 160 feet long and 60 feet wide, with 10-foot basement. In the rear of this is a new brick boiler and engine house, 100 feet long and 40 feet wide. A nest of new boilers have a joint capacity of 700 horse-power, and three new engines have a combined capacity of 600 horse-power. An auxiliary power plant is located 2 miles from the shops, where water power is developed from a 135-foot fall and transmitted to the shops by electricity. There is also the old steam plant, with 425 horse-power capacity. There will be little delay in moving the departments to the new building and no interference with production.

The company has recently issued a stiff covered booklet, vest pocket size, entitled "Simonds' Guide for Carpenters," which it will be pleased to furnish gratis to Hardware merchants for distribution to their customers. This little work contains a mass of information gathered from different sources, of interest and value to carpenters and others.

AMERICAN SWISS FILE & TOOL COMPANY.

AMERICAN SWISS FILE & TOOL COMPANY, Elizabeth, N. J., has been awarded a gold medal in connection with its exhibit at the recently concluded Louisiana Purchase Exposition. This company makes a specialty of the finer grades of Files, those used by tool makers, die sinkers, jewelers, machinists, watch makers and dentists, such as are imported from Switzerland. Its founder is Edward P. Reichhelm, a mechanical engineer of much experience, who has built an up to date factory, equipped with the best modern machine tools, including several specially designed, and first commenced operations in January, 1900. While the original conception of the methods of production proved to be correct, it required much patient labor and capital to put them into practice with a working force which had to be

January 19, 1905

newly created, and the experiments, in which Herman Neff, superintendent, took an important part, with both men and product were persistently continued until 1903, when the company finally found itself in a position to offer a full and complete line of these Files, in the confidence that they were equal in every respect to the imported, and that year the first dividend on its capital stock was declared. Mr. Reichhelm is also president of the American Gas Furnace Company, which supplied the mechanical heating devices used in connection with the Government's mint exhibit at St. Louis, Mr. Reichhelm supervising the installation of this exhibit.

FACTORY COST AND BUSINESS METHODS. AN ADMIRABLE STOCKROOM.

THE WELLS BROS. COMPANY, Greenfield, Mass., has completed its stockroom equipment, so that the department may be considered as nearly fire proof as it is possible to make it, and at the same time the arrange-



Fire Proof Stockroom of Wells Bros. Company.

ment is one to produce the maximum of convenience in handling and in keeping account of stock. It is a room, 45 x 100 feet. The floor is of concrete. The shelves, which might better be called gratings or racks, are carried on cast iron arms upon 1½-inch iron pipe uprights, the arms being held at the desired height by means of heavy set screws, making them easy of adjustment to

room and the door is kept locked, no one being admitted except the stock man.

**A CONVENIENT FORM
OF STOCK RECORD.**

A complete record is maintained of the stock carried in the stockroom by means of a card system at the office. This record is constantly maintained so that every night at close of business the company has a complete inventory of its stock. This does not include the goods in the shipping and surplus room, as it is called, and under the company's system these latter goods are not considered in the inventory, excepting perhaps that in taking account of stock for the annual statement an approximation might be made, provided the surplus stock ready for the shipping clerk aggregated a considerable amount. When stock in the shipping room and surplus room, which are one and the same thing, gets low the stock man or the office is notified and the necessary goods are delivered from the stockroom, the amount being entered upon the corresponding cards of the stock index.

ARRANGEMENT OF STOCK CARD.

The card containing the record of stock is shown herewith. As will be noted the record of orders to the shop for the particular Tap with which the card has to do is kept in the left hand columns, the date and number of order and its amount being given. The next two sections of the card are alike, to permit of the record being carried forward on the same card instead of requiring a new card when one longitudinal space is filled. The date of receipt of stock in the stockroom and the number of pieces is recorded together with the date and number of pieces issued to the shipping department and the balance on hand. In the upper right hand corner are the maximum and minimum figures indicating the limits of orders to the factory.

The system is not at all complicated and works, we are advised, to the convenience of all concerned and consequently economically.

GLEN MFG. COMPANY.

THE GLEN MFG. COMPANY, Ellwood City, Pa., maker of Steel and Wire specialties, has purchased all the machinery for making the Hartman Steel Picket Fence, Crimped Picket Fence, Stockade Fence, Tree Guards, Hartman Flexible Wire Mats, &c., formerly owned by the Cuyahoga Wire & Fence Company at New Castle, Pa. The company has also purchased the patent rights, the use of the Hartman name, the finished stock, in fact everything connected with the Hartman Mfg. Company when located at Ellwood City. It is the intention to manufacture this full line and the company will be able to furnish goods by March 1 next. The Glen Mfg. Company has purchased two buildings in Ellwood City

Card Containing Record of Stock.

any position. The arms are slotted to fit $\frac{3}{8}$ x 1 inch iron bars, set on edge, these being the shelving. The uprights are 20 inches apart in pairs, and longitudinally of the shelves the posts are about 6 feet apart. Each corridor between the shelves is covered by a traverse ladder. The goods are carried in wrought iron boxes. This room is screened off from the shipping and surplus

for factory purposes, one 100 x 200 feet and the other 80 x 100 feet. This addition will increase the output over 100 per cent. The company will have ready in a short time a complete catalogue showing its entire line of products. At the present time Iron Fences, Fire Escapes, Glen Steel Folding Mats and Ornamental Iron-Work generally are manufactured.

MISCELLANEOUS NOTES.

Standard Eclipse Levels.

The Baker, McMillen Company, Akron, Ohio, has put on the market a line of Standard Eclipse plumbs and levels in addition to its regular line of Akron Eclipse levels. The latter have double glass, the delicate spirit tube being inclosed in a heavy outer tube, which makes them almost unbreakable, while the Standard line is made with the spirit tube only. The Standard levels are put on the market to meet the demand for a cheaper article than the Akron.

Solidhd Thumb Tacks.

Hawkes-Jackson Company, 82 Duane street, New York, is manufacturing an additional line of its Solidhd brand of thumb tacks, about $\frac{5}{8}$ inch diameter head, much larger than the regular lines of brass head thumb tacks long regularly made by them. The new line is designed for a great variety of uses, among which are for numbering systems and price indicators. For instance, they can be easily pushed into shelving under a line of goods and a number or other brief designation, price, &c., written with pencil or pen, and as easily changed to another position or rubbed or washed off for another entry. White, black or any of the colors can be furnished in suitable quantities to order, the goods being made regularly in red, white, blue, green, buff and black. The color, whatever it may be, is covered with thin transparent celluloid, that is so successfully done as to appear to be one piece. They are also suitable for tacking up calendars, pictures, posters, &c., in an easy and artistic way, and with little appreciable damage to walls from the small round tack. The thumb tacks are also being made with college colors and initials or insignia of any kind for clubs, societies, &c., and can be stuck directly into the lapel of a coat, to which they adhere without likelihood of falling out. They can also be supplied with numbers for designating window screens, with photographs of political or other candidates, and in a large variety of special designs according to the wants of the purchaser. The entire line is put up in containers of various sizes and forms—square, triangular and hexagonal—with varying capacities, to stand on a counter to sell from, the tacks being stuck into covered square blocks in multiples of 12 and held in the display rack referred to, which is shown in a 16-page booklet sent gratis to any who are interested.

Jones' Push Tack and Driver.

The Oakman Bros. Company, 45 Murray street, New York, has just put on the market the Jones push tack and push tack driver, here illustrated. The push tack driver, Fig. 1, is $5\frac{1}{4} \times 1\frac{1}{8}$ inches, greatest dimensions, made of wood, with nickled metal parts, there being a groove in the center into which a strip of sheet metal

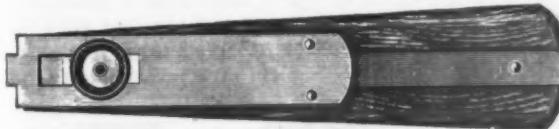


Fig. 1.—Jones' Push Tack and Driver.

glaziers' points, 16 in number, is introduced for quickly securing glass in sash, picture frames, &c. The individual then feeds the strip along, pushes a point into



Fig. 2.—Strip of Push Tacks, Two-thirds Size.

position and as quickly with an outward motion breaks off the point in sash, when the operation is expeditiously continued by pushing the button-like slide downward, which projects another point into place, and so on until

the strip is exhausted, when another is inserted. This tool is designed for the professional or amateur, either in factories or for glaziers, painters, carpenters, picture frame makers, upholsterers, &c. A line of special tacks

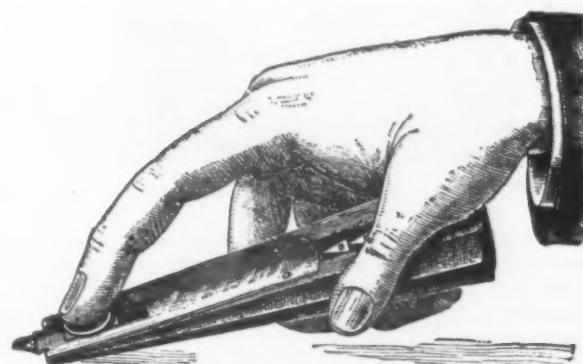
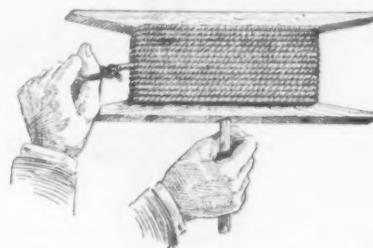


Fig. 3.—Method of Using.

are being made for a variety of purposes to be used in this tool besides the style seen in Fig. 2. The point is made that a sash can be glazed quickly and without breakage, as no hammering is necessary.

The Handy Clothes Line Reel.

The R. B. Novelty Works, 867 Conway street, St. Paul, Minn., is offering the clothes line reel shown herewith. It holds 300 feet of line and is alluded to as being made from the best of materials and put up in a workmanlike manner. With this device clothes lines can be kept free



The Handy Clothes Line Reel.

from kinks and snarls while being put up and taken down; also the lines are kept clean and time is saved. The cut illustrates the manner of holding it when unreeling the line. When winding the line the reel is held partly by the handle and partly by the frame, the winding being done with the other hand.

U. M. C. Short Range Loaded Shot Shells.

The Union Metallic Cartridge Company, Bridgeport, Conn., is directing special attention to its new short range shot shells for close range game shooting, as here illustrated. These shells are manufactured by a special process to which much time and experimentation have been given and for which a patent is pending. The object



Fig. 1.—Arrow Short Range Loaded Shot Shells.

of these special loads is to give the same spread of shot at 25 yards as is obtained at 40 yards regularly loaded, at the same time, by the new method of introducing the powder gas into the shot charge, giving practically the same velocity with less recoil. The advantage of these short range shell loads is in brush and field shooting,

when it frequently happens that the bird is either missed or unnecessarily mutilated with the regular load at short range, which is further aggravated when choke bored guns are used. The short range loaded shells are supplied in Arrow, Fig. 1, and Nitro Club, No. 2, brands only,



Fig. 2.—Nitro Club Short Range Loaded Shot Shells.

loaded with five of the leading smokeless powders and at the same prices as for corresponding regular loads. The shells can be supplied in 12 gauge with 3 drs. of powder (24 grains) and 1½ ounces Nos. 6 to 10 shot, soft or chilled, and 16 gauge with 2½ drs. of powder (20 grains) and 1 ounce of shot, same sizes and kinds. The shells are distinctly marked in large figures "25 Yards," as shown, so that the character of shell slipped into the breech is apparent at a glance.

Combination Breast and Chain Drill No. 7307.

Goodell-Pratt Company, Greenfield, Mass., is putting on the market the combination drill shown herewith. It consists of the company's No. 307 automatic feed chain drill, with a chuck holding square shanks, and a special long spindle attached to one of the company's regular



Combination Breast and Chain Drill No. 7307.

double speed breast drill frames. This brings the work a little nearer to the operator than is possible where the shank of the chain drill is inserted into a breast drill or brace chuck. The total length of the tool is 21 inches. It has two speeds, automatic feed, cut gears, adjustable breast plate, ball bearings, and is equipped with 3 feet of steel chain. The tool is finished after the usual manner of the company's breast and chain drills.

Stanley Chute Board.

The Stanley Rule & Level Company, New Britain, Conn., and 107 Chambers street, New York, has added to its large line of wood working tools the Stanley chute board No. 52, here illustrated. This tool, sometimes called a jack board, is offered more particularly for pattern, cabinet and frame makers, it is remarked, although almost indispensable for any joiner or wood worker, pro-

fessional or amateur, who miters wood. The cast iron base, ribbed construction, has an adjustable runway for the plane, the latter being shown separately in Fig. 2. All working parts are accurately machined for fine, smooth work, and remaining surfaces are black japanned. The swivel is indexed for cutting a square, 90 degrees, and a



Fig. 1.—Stanley Chute Board.

45-degree miter, there being a hole in the base for a positive stop in connection with both these important cuts, but any desired angle between zero and 90 degrees can be obtained by means of a quick adjusting clamp screw. The plane iron is fitted with a lateral adjustment, so that a cut giving any ordinary draft can be made. The sliding back supports the work close to the plane, which prevents any tendency to splinter. The sliding back clamp will hold

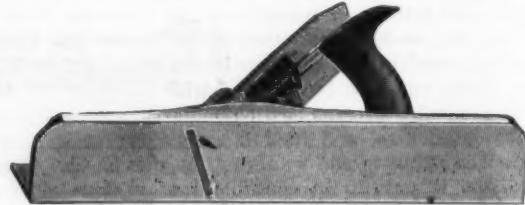


Fig. 2.—View of Plane, Detached.

any shaped work in position for planing—for instance, molding or other material where the flat portion must be parallel with the board bed to get a true bevel. The plane itself is constructed especially for the board, the base of which is 9 x 22 inches, and the plane iron is askew so as to produce a smooth, clean cut. With this tool a miter or square after being sawed can be accurately and quickly trued to make a perfect joint without any especial attempt at fitting, thereby economizing time.

The All Right Bread Cutter.

The bread cutter herewith illustrated is made of kiln dried sugar maple lumber and put together with blued steel screws. It has rubber foot rests to prevent slipping or marring furniture. The cutter is adjustable to differ-



The All Right Bread Cutter.

ent size loaves and cuts from $\frac{1}{4}$ -inch up. The serrated knife has a specially designed handle. The device is offered by the R. B. Novelty Works, 867 Conway street, St. Paul, Minn.

The Jewel Cake Turner.

We herewith illustrate a cake turner, designated by its manufacturer, the Arcade Mfg. Company, Freeport,



The Jewel Cake Turner.

Ill., as being indestructible, because it is made entirely of steel. It is light in weight and easily cleaned. The flat, serpentine handle gives a firm grip, and the ring at the end serves as a means for hanging it up.

Pocket Screw Drivers No. 553.

The lower one of the two cuts in the accompanying illustration represents a screw driver made from steel tubing, knurled and nickel plated. The butt of the blade fits a solid lock in the tube, preventing it turning, and is held from coming out by a slight turn of the chuck. For carrying in the pocket the blade is reversed, inserted in the handle, as shown in the upper cut in the illustration, and the chuck is given a slight turn to keep it in place. It takes up no more room in the pocket than a pen knife. The blades are properly tempered. The tool is made in A and B sizes, the handle of A size being $\frac{1}{4}$ inch in diameter, with blade $2\frac{1}{4}$ inches long, and weighs $\frac{1}{2}$ ounce. The handle of size B is $\frac{5}{16}$ inch in diameter, with a 3-inch blade, and weighs $1\frac{1}{2}$ ounces. Extra blades may be pur-

Adjustable Window Cleaner.

F. H. Smith Mfg. Company, Chicago, is offering the trade the Common Sense adjustable window cleaner,



The Jewel Cake Turner.

which we illustrate. The novelty of the device is a spring in the handle which tends to equalize pressure on the



Adjustable Window Cleaner.

window, no matter what the angle of the pole, permitting the operator to keep the rubber shoe against the glass on



Pocket Screw Drivers No. 553.

chased separate from the driver. The tool is put on the market by the L. S. Starrett Company, Athol, Mass.

the downward stroke almost to the bottom of the pane. The rubber may be replaced easily at nominal expense.

PAINTS, OILS AND COLORS**White Lead, Zinc, &c.—**

$\frac{3}{4}$ lb. Lead, English white, in Oil. 9%@2%

Lead, American white, in Oil:

Lots of 500 lb or over. @ 6%

Lots less than 500 lb. @ 7%

In Barrels. @ 6

Lead, White, in oil, 25 lb tin

pails, add to keg price. @ 3%

Lead, White, in oil, 12½ lb tin

pails, add to keg price. @ 1

Lead, White, in oil, 1 to 5 lb

ass'ted tins, add to keg price. @ 1½

Lead, American. Terms: For lots 12

tons and over $\frac{1}{4}$ c. rebate, and 2% for

cash if paid in 15 days from date of

invoice; for lots of 600 lbs and over

2% for cash if paid in 15 days from

date of invoice, for lots of less than

500 lbs, net. @ 6

Lead, White, Dry in blbs. @ 6

Zinc, American, dry. 4%@ 4%

Zinc, French:

Paris, Red Seal, dry. 8%

Paris, Green Seal, dry. 9%

Antwerp, Red Seal, dry. 7%

Antwerp, Green Seal, dry. 8%

Zinc, V. M. French, in Poppy Oil:

Green Seal:

Lots of 1 ton and over. 11%@12%

Lots of less than 1 ton. 12%@12%

Zinc, V. M. French, in Poppy Oil:

Red Seal:

Lots of 1 ton and over. 10%@11%

Lots of less than 1 ton. 10%@11%

Discounts—French Zinc—Discounts

to layers of 10 bbls, lots of one or mixed

grds, 1%; 25 bbls, 2%; 50 bbls, 4%.

Dry Colors—

Black, Carbon. 5 @10

Black, Drop, Amer. 5 @6

Black, Drop, Eng. 5 @15

Black, Ivory. 16 @20

Lead, Com. 14% @ 6

Celestial. 4 @ 6

Blue, Chinese. 29 @32

Blue, Prussian. 27 @30

Blue, Ultramarine. 14% @15

Brown, Spanish. 4@ 1

Caroline, No. 40. \$3.56@4.00

Green, Chrome, ordinary. 34@ 6

Green, Chrome, pure. 17 @25

Lead, Red, blbs, $\frac{1}{2}$ blbs, and kegs:

Lots 500 lb or over. @ 6½

Lots less than 500 lb. @ 7

Litharge, blbs, $\frac{1}{2}$ blbs, and kegs:

Lots 500 lb or over. @ 6½

Lots less than 500 lb. @ 7

Ocher, American. $\frac{3}{4}$ ton \$8.50@16.00

Ocher, American Golden. 2½@ 3½

Ocher, French. 2½@ 2½

Ocher, Foreign Golden. 3 @ 4

Orange Mineral, English. 8%@10%

Orange Mineral, French. 10%@11%

Orange Mineral, German. 7%@10

Orange Mineral, American. 8 @ 8½

Red, Indian, English. 4%@ 8½

Red, Indian, American. 3 @ 10

Red, Turkey, English. 4 @ 10

Red, Tuscan, English. 7 @ 10

Red, Venetian, Amer. 100 lb \$0.50@1.25

Red, Venetian, English. 100 lb \$1.15@1.75

Sienna, Italian, Burnt and

Powdered. 3 @ 9½

Sienna, Raw. 1½@ 2

Sienna, American, Raw. 1½@ 2

Sienna, American, Burnt and

Powdered. 1½@ 2

Terra, French. $\frac{3}{4}$ ton \$29.00@30.00

Talc, American. $\frac{3}{4}$ ton \$13.75@25.00

Terra Alba, French. 100 lb 90 @ 1.00

Terra Alba, English. 100 lb 90 @ 1.00

Terra Alba, American. 100 lb

No. 1. 60 @ 70

Terra Alba, American. 100 lb

No. 2. 45 @ 50

Umber, T'key, Brt. & Pow. 2½@ 3½

Umber, Turkey, Raw & Pow. 2½@ 3½

Umber, Burnt, Amer. 1½@ 2

Umber, Raw, Amer. 1½@ 2

Yellow, Chrome. 11 @ 14

Vermilion, American Lead. 10 @ 25

Vermilion, Quicksilver, bulk. 45 @ 65

Vermilion, Quicksilver, bags. 45 @ 65

Vermilion, English, Import. 75 @ 80

Vermilion, Chinese. 30.90@1.00

Green, Chrome. 10 @ 15

Green, Paris. 12 @ 24

Sienna, Raw. 12 @ 15

Sienna, Burnt. 12 @ 15

Umber, Raw. 11 @ 14

Umber, Burnt. 11 @ 14

Primer—

In bladders. 1½@ 2

In bulk. $\frac{3}{4}$ ton \$17.50@19.00

Barytes, Amer. floated. $\frac{3}{4}$ ton 17.00@18.50

Barytes, Crude, No. 1. $\frac{3}{4}$ ton 10.00@11.00

Chalk, in bulk. 3.00@ 3.25

Chalk, in blbs. 100 lb @ 30

China Clay, English. $\frac{3}{4}$ ton 11.00@17.00

Cobalt, Oxide. 100 lb 2.50@ 2

Whiting, Common. 100 lb 45@ 48

Whiting, Gilders. 100 lb 55@ 57

Whiting, Ex. Gilders. 100 lb 58@ 60

V. S. O. 60 @ 25

Animal, Fish and Vegetable Oils— $\frac{3}{4}$ gal.

Linseed, City, raw. 45 @ 44

Linseed, City, boiled. 45 @ 46

Linseed, State and West'n, raw. 41

Linseed, raw Calcutta seed. 65

Lard, Prime, Winter. 56 @ 58

Lard, No. 2. 36 @ 38

Cotton-seed, Crude f.o.b. mills. 17

Cotton-seed, Summer Yellow. 22%@24

Cotton-seed, off grades. 22 @ 23½

Sperm, Crude. 60 @ 61

Sperm, Natural Spring. 6

Sperm, Bleached Spring. 6

Sperm, Natural Winter. 62 @ 64

Sperm, Bleached Winter. 65 @ 67

Tallow, Prime. 48 @ 50

Whale, Crude. 6

Whale, Natural Winter. 45 @ 46

Whale, Bleached Winter. 47 @ 48

Menhaden, Brown, Strained. 27 @ 28

Menhaden, Light, Strained. 28 @ 29

Menhaden, Bleached Winter. 30 @ 32

Menhaden, Ex-Bld., Winter. 32 @ 33

Menhaden, Southern. 19%@20

Cocoanut, Ceylon. 6 @ 6½

Cocoanut, Cochinch. 6 @ 7½

Cod, Domestic, Prime. 36 @ 38

Cod, Newfoundland. 39 @ 41

Red Elaine. 3 @ 3½

Red Saponified. 4% @ 5

Olive, Italian, blbs. 53 @ 56

Neatsfoot, prime. 50 @ 51

Palm, prime Logos. 6 @ 6 @ 6½

Mineral Oils—

Black, 29 gravity, 25@30 cold test. 10%@11½

Black, 29 gravity, 15 cold test. 11%@12½

Black, Summer. 10%@11½

Cylinder, light filtered. 18 @ 19

Cylinder, dark filtered. 16 @ 17

Paraffine, 90-97 gravity. 12%@13

Paraffine, 90-97 gravity. 11%@12

Paraffine, 88-93 gravity. 9%@ 9½

Paraffine, Red. 11%@13

In small lots $\frac{1}{2}$ advance.

Colors in Oil—

Black, Lampblack. 12 @ 14

Blue, Chinese. 3 @ 4½

Blue, Prussian. 3 @ 3½

Blue, Ultramarine. 13 @ 16

Brown, Spanish. 4@ 1

Carmine, No. 40. \$3.56@4.00

Green, Chrome, ordinary. 34@ 6

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus $33\frac{1}{3}$ @ $33\frac{1}{3}$ & 10% signifies

that the price of the goods in question ranges from $33\frac{1}{3}$ per cent. discount to $33\frac{1}{3}$ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1904, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, $\frac{1}{2}$ doz.	\$3.00	$33\frac{1}{3}\%$
North's.....		$10\frac{1}{2}\%$
Zimmerman's—See Fasteners, Blind.		

Window Stop—

Ives' Patent.....	$35\frac{1}{2}\%$
Taplin's Perfection.....	$35\frac{1}{2}\%$

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Eagle Anvils.....	$\frac{3}{4}$ lb. $7\frac{1}{2}$ ¢
Hay-Budden, Wrought.....	$9\frac{1}{2}$ ¢
Horseshoe brand, Wrought.....	$9\frac{1}{2}$ ¢

Trenton.....	$\frac{3}{4}$ lb. $9\frac{1}{2}$ ¢
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Imported—

Peter Wright & Sons.....	$\frac{3}{4}$ lb. $10\frac{1}{2}$ ¢
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Anvill, Vise and Drill—

Millers Falls Co., \$15.00.....	$15\frac{1}{2}$ & 10%
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Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Hull Bros. Co.....	$30\frac{1}{2}$ & 10%
Livingston Nail Co.....	$33\frac{1}{2}\%$

Augers and Bits—

Com. Double Spur.....	$75\frac{1}{2}$ @ $75\frac{1}{2}$ & 10%
Boring Mach. Augers, $70\frac{1}{2}$ @ $75\frac{1}{2}$ & 10%	

Car Bits, 12-in. twist.....	$60\frac{1}{2}$ @ $60\frac{1}{2}$ & 10%
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Jennings' Pattern.....	$60\frac{1}{2}$ @ $60\frac{1}{2}$ & 10%
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Ford's Auger and Car Bits.....	$40\frac{1}{2}$ & 10%
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Forstner Pat. Auger Bits.....	$25\frac{1}{2}$ & 10%
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C. E. Jennings' & Co.: No. 10 ext. lip, R. Jennings' list.....	$25\frac{1}{2}$ & 10%
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Russell Jennings' list.....	$25\frac{1}{2}$ & 10%
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L'Hommedieu Car Bits.....	$45\frac{1}{2}$ & 10%
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Mayhew Countersink Bits.....	$45\frac{1}{2}$ & 10%
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Millers Falls.....	$50\frac{1}{2}$ & $47\frac{1}{2}$ & 10%
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Ohio Tool Co.'s Bailey Aug. and Car Bits.....	$40\frac{1}{2}$ & 10%
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Pugh's Black.....	$20\frac{1}{2}$ & 10%
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Pugh's Jennings' Pattern.....	$35\frac{1}{2}\%$
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Snell's Auger Bits.....	$60\frac{1}{2}$ & 10%
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Snell's Bell Hangers' Bits.....	$60\frac{1}{2}$ & 10%
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Snell's Car Bits, 12-in. twist.....	$60\frac{1}{2}$ & 10%
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Wright's Jennings' Bits (R. Jennings' list).....	$50\frac{1}{2}$ & 10%
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Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's small, \$18; large, \$26... $50\frac{1}{2}$ & 10%

Clark's Pattern, No. 1, $\frac{1}{2}$ doz.	\$26
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No. 2, $\frac{1}{2}$ doz.	$50\frac{1}{2}$ & 10%
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Ford's, Clark's Pattern, $50\frac{1}{2}$ @ $50\frac{1}{2}$ & 10%

C. E. Jennings' & Co., Steer's Pat.	$25\frac{1}{2}$ & 10%
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Swan's.....	$60\frac{1}{2}$ & 10%
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Gimlet Bits—

Per gro.

Common Dbl. Cut.....	$33\frac{1}{3}$ @ $33\frac{1}{3}$ & 25%
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German Pattern, 4-32 to 8-32.....	$33\frac{1}{3}$ @ $33\frac{1}{3}$ & 25%
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German Pattern, 4-32 to 8-32.....	$33\frac{1}{3}$ @ $33\frac{1}{3}$ & 25%
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Hollow Augers—

See Drills, Cut.

Ship Augers and Bits—

Ford's.....	$40\frac{1}{2}$ & 10%
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C. E. Jennings' & Co.: L'Hommedieu's.....	$15\frac{1}{2}$ & 10%
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Watrous'.....	$35\frac{1}{2}\%$
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Ohio Tool Co.'s.....	$40\frac{1}{2}$ & 10%
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Snell's.....	$40\frac{1}{2}$ & 10%
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Awl Hafts—

See Hafts, Awl.

Awls—

Handled.....	gro. $\$2.75$ @ $33\frac{1}{3}$
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Unhandled, Shilded.....	gro. $\$3.67$ @ $33\frac{1}{3}$
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Unhandled, Patent.....	gro. $\$6.00$ @ $70\frac{1}{2}$ & 10%
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Unhandled, Patent.....	gro. $\$1.31$ @ $33\frac{1}{3}$
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Unhandled, Shilded.....	gro. $\$1.40$ @ $33\frac{1}{3}$
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Scratch Acls:

Handled, Com.	gro. $\$3.50$ @ $33\frac{1}{3}$
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Handled, Socket....	gro. $\$1.50$ @ 12.00
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Hurwood.....	$40\frac{1}{2}$ & 10%
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Awl and Tool Sets—

See Sets, Awl and Tool.

Axes—

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Calipers—See Compasses.**Calks, Toe and Heel—**

Blunt, 1 prong.....	per lb. \$4.45
Sharp, 1 prong.....	per lb. \$4.45
Gautier, Blunt.....	16¢
Gautier, Sharp.....	4¢
Perkins', Blunt Toe.....	\$3.65
Perkins', Sharp Toe.....	\$4.15

Can Openers—**See Openers, Can.****Cans, Milk—**

Illinois Pattern.....	\$1.35
New York Pattern.....	1.85
Baltimore Pattern.....	2.20
Dubuque.....	1.50
Illinois Pattern.....	1.60
Illinois Pattern.....	1.75

Cans, Oil—

Buffalo Family Oil Cans:	5 gal.
3 gal.	5 gal.
\$18.00	60.00
129.60 gro. net.	

Caps, Percussion—

Eley's E. B.....	52¢
G. D.....	per M \$3.35
F. L.....	per M 40¢
G. E.....	per M 40¢
Musket.....	per M 62¢

Primers—

Berdan Primers, \$2 per M.	20¢
B. L. Caps (Sturtevant Shells)	20¢
\$2 per M.....	20¢
All other primers per M. \$1.50	1.60

Cartridges—

Blank Cartridges:	10¢
32 C. F. \$5.50.....	10¢
38 C. F. \$7.00.....	10¢
22 cal. Rim, \$1.50.....	10¢
32 cal. Rim, \$2.75.....	10¢
B. B. Caps, Con. Ball, Swyd, \$1.90.....	10¢
B. B. Caps, Round Ball.....	10¢
Central Fire.....	25¢
Target and Sporting Rifle.....	15¢
Primed Shells and Bullets, 15¢	10¢
Rim Fire, Sporting.....	10¢
Rim Fire, Military.....	15¢

Casters—

Bed.....	70¢
Plate.....	60¢
Philadelphia.....	75¢
B. L. Caps (Sturtevant Shells)	20¢
\$2 per M.....	20¢
All other primers per M. \$1.50	1.60

Cattle Leaders—**See Leaders, Cattle.****Chain, Coil—**

American Coil, Straight Link:	
3-16 1/4 5-16 9/16 7-16 3/2 9-16	
7-10 5-10 4-15 3-15 3-30 3-20 3-15	
5/8 3/4 1 1/2 1 to 1/4 inch,	
3-10 3-00 2-95 2.95 per 100 lb.	

German Coil.....	60¢
Halter Ties—	10¢

Halter Chains.....	60¢
German Pattern Halter Chains	10¢
list July 21, '97.....	60¢

Cow Ties.....	60¢
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Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.	6¢
6-6-3, Straight, with ring, \$23.50	
6-2-2, Straight, with ring, \$24.50	
6-8-2, Straight, with ring, \$28.00	
6-10-2, Straight, with ring, \$32.00	

NOTE—Add 2¢ per pair for Hooks.

Twist Traces 2¢ per pair higher than

Straight Link.

Trace, Wagon and Fancy

Chains..... 60¢

Miscellaneous—

Jack Chain, list July 19, '93:	
Iron.....	60¢
Brass.....	60¢
Safety Chain.....	75¢
Gal. Pump Chain.....	15¢

Covert Mfg. Co.:	
Breast.....	40¢
Halter.....	40¢
Heel.....	40¢
Rein.....	40¢
Stallion.....	40¢

Covert Sad. Works:	70¢
Breast.....	70¢
Halter.....	70¢
Heel.....	70¢
Rein.....	70¢

Community:	
Am. Coil and Halters.....	40¢
Am. Cow Ties.....	45¢
Eureka Coil and Halter.....	45¢
Niagara Coil and Halter.....	45¢
Niagara Coil and Ties.....	45¢
Niagara Wire Dog Chains.....	45¢

Wire Goods Co.:	
Dog Chain.....	70¢
Universal Dbl. Jointed Chain.....	50¢

Chalk—(From Jobbers.)

Carpenters' Blue.....	gro. \$55
Carpenters' Red.....	gro. \$30
Carpenters' White.....	gro. \$25

See also Crayons.

Checks, Door—

Hardsley's.....	45%
Columbia.....	50¢
Belrose.....	60¢

Chests, Tool—

American Tool Chest Co.:	
Boy's Chests, with Tools.....	55¢
Youth's Chests, with Tools.....	40¢
Gentlemen's Chests, with Tools.....	30¢
Farmers' Carpentry's, etc., Chests, with Tools.....	20¢
Machinists' and Pipe Fitters' Chests, Empty.....	50¢
Tool Cabinets.....	50¢
E. Jennings & Co.'s Machinists' Tool Chests.....	33¢

See also Crayons.

Clothes, Laundry—**See Washers.****Clothes, Laundry**

Faucets—

Cork Lined.....	50@50&10%
Metallic Key, Leather Lined.....	60&10@70%
Red Cedar.....	40@10@50%
Petroleum.....	70@10@75%
B. & L. B. Co.: Metal Key.....	60&10% Star.....
West Lock.....	50@10%
John Sommer's Peering Tin Key.....	40@10%
John Sommer's Boss Tin Key.....	50@10%
John Sommer's Victor Mfg. Key.....	50@10%
John Sommer's Duplex Metal Key.....	60@10%
John Sommer's Diamond Lock.....	40@10%
John Sommer's I.X.L. Cork Lined.....	50@10%
John Sommer's Reliable Cork Lined.....	50@10%
John Sommer's Chicago Cork Lined.....	60@10%
John Sommer's O. K. Cork Lined.....	50@10%
John Sommer's No Brand, Cedar.....	50@10%
John Sommer's Perfection, Cedar.....	40@10%
McKenna, Brass: Burglar Proof, N. P.	25@10%
Improved, 3% and % inch.....	25@10%
Self Measuring: Enterprise, P. doz. \$36.00.....	40@10%
Lane's, P. doz. \$36.00.....	40@10%
National Measuring, P. doz. \$36.00@10%	

Felloe Plates—

See Plates, Felloe.

Files— Domestic—

List revised Nov. 1, 1899.

Best Brands.....	70@10@75&5%
Standard Brands, 75@10@75@10@10% Lower Grade.....	75@10@10@80@10%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97.....	33 1-3@40%
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Fixtures, Fire Door—

Richards Mfg. Co.: Universal, No. 103.....	34.00
Special, No. 104.....	34.00
Fusible Links.....	30.25
Expansion Bolts.....	50@10%

Grindstone—

Net Prices:	
Inch	15 17 19 21 24
Per doz. \$2.15	2.85 3.25 3.75 4.50
P. S. & W. Co.	30@10@40%
Reading Hardware Co.	60@10%
Sargent's	70@10%
Stowell's Giant Grindstone Hanger.	\$2.00
Stowell's Grindstone Fixtures, Extra Heavy	50@10@10%
Stowell's Grindstone Fixtures, Light	60@10%

Fodder Squeezers—

See Compressors.

Forks—

Base Discounts Aug. 1, 1899, list:	
Hay, 2 tine.....	50@10@5%
Boys' & Fish, 2 tine.....	50@10@5%
Hay & Boys', 3 tine.....	60@5%
Hay & Boys', 4 tine.....	66@5%
Champion Hay.....	66@5%
Hay & Header, long 3 tine.....	63@5%
Header, 4 tine.....	63@5%
Barley & 5 tine, Steel.....	60@20%
Manure, 4 tine.....	50@15@5%
Manure, 5 & 6 tine.....	66@2@5%
Spading.....	70@2@5%
Potato Digger, 6 tine.....	60@10%
Sugar Beet.....	40@10%
Coke & Coal.....	40@10%
Heavy Mill & Street.....	69@5%
Iowa Dig-Ezy Potato.....	60@10%
Victor, Hay.....	60@15@2@5%
Victor, Manure.....	60@10@5%
Victor, Header.....	65@5%
Champion, Hay.....	65@5%
Champion, Header.....	65@5@2@5%
Columbia, Hay.....	60@20%
Columbia, Manure.....	70@10%
Columbia, Spading.....	70@12@5%
Hawkeye Wood Barle.....	50@10%
W. & C. Potato Digger.....	60@10%
Acme Hay.....	60@20%
Acme Manure, 4 time.....	60@10@5%
Dakota Header.....	60@20%
Jackson Steel Barley.....	60@20%
Kansas Header.....	65@5%
W. & C. Favorite Wood Barley.....	40@10%

Plated.—See Spoons.

Frames— Saw—

White, S'g't Bar, per doz. 75@80@	
Red, S'g't Bar, per doz. \$1.00@1.25	
Red, Dbl. Brace, per doz. \$1.40@1.50	

Freezers, Ice Cream—

Qt.	1 2 3 4 5
Each	\$1.25 \$1.00 \$1.00 \$2.20 \$2.80

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.

Fuse—Per 4000 Feet.

Hemp.....	\$2.75
Cotton.....	3.20
Waterproof Sgl. Taped.....	3.65
Waterproof Dbl. Taped.....	4.40
Waterproof Tpl. Taped.....	5.15

Gates, Molasses and Oil—

Stebbins' Pattern.....	50@10@80@10@5%
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Gauges—

Marking, Mortise, &c.	50@10@5@50@10@5%
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Marking, Mortise, &c.

Scholl's Patent.....

Door Hangers.....

Stanley R. & L. Co.'s Butt and

Rabbit Gauge.....

Wire, Brown & Sharp's.....

Wire, Morse's.....

Wire, P. S. & W. Co.

30@10@5%

50@10@5%

50@10@5%

50@10@5%

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Wrought Iron Hinges—
Strap and T Hinges, &c., list
December 20, 1904:

Light Strap Hinges	70%
Hvy Strap Hg's.	75@85%
Light T Hinges	65%
Heavy T Hinges	60%
Extra Hvy T Hg's.	70@10%
Hinge Hasps	50%
Cor. Heavy Strap	75@65%
Cor. Ex. Heavy T	70@10%
Screw Hook	6 to 12 in., lb. 3@2@
and Strap	{ 1 to 20 in., lb. 3@4@
	{ 22 to 36 in., lb. 3@4@

Screw Hook and Eye:
3/4 to 1 inch..... lb. 6@
5/8-inch..... lb. 7@
1/2-inch..... lb. 9@

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers...35%

Hods—Coal—
Per doz.

Inch	15	16	17	18
Galv. Open	\$2.50	2.75	3.00	3.25
Jap. Open	\$1.90	2.10	2.25	2.55
Galv. Funnel	\$3.00	3.30	3.60	3.90
Jap. Funnel	\$2.45	2.65	2.85	3.00

Masons, Etc.—

Cleveland Wire Spring Co.:
Steel Mortar..... each \$1.45
Steel Brick..... each \$1.10

Hoes—Eye—

Scovil and Oval Pattern:
60@10@60@10@10%

Grub, list Feb. 23, 1899:

D. & H. Scovil..... 35%

Handled—

August 1, 1899, list:

Field and Garden..... 70@10%

Smith's Patent..... 50%

Meadow & Rhode Island..... 75%

Black Diamond..... 70@10%

Mortar and Street..... 70@10@10%

Planters'..... 75@12@2%

Cotton..... 70@10@10%

Cotton Chopper..... 75@12@2%

Weeding Hoes..... 66@15@15%

Steel Weeders..... 66@15@15%

Maleable Weeders..... 66@15@15%

Ft. Madison Cotton Hoe..... 70@10@10%

Ft. Madison Crescent Cultivator Ho.

doz..... 70@10%

Ft. Madison Mattock Hoes:

Regular Weight..... doz. 65@%

Junior Size..... doz. 44@%

Ft. Madison Sprouting Hoe..... doz. 50@%

Ft. Madison Dixie Tobacco Hoe..... 75@10@10@%

Kretzinger's Cut Easy..... 70@10@10@%

Warren Hoe..... 45@10@

W. & C. Ivanhoe..... 50@10@

B. B. 6 in. Cultivator Ho.

doz..... 43@15

Acme Wedding..... doz., net, 44@35

W. & C. L'tning Shovel Hoe, Pdoz. 44@85

Hoisting Apparatus—
See Machines, Hoisting.

Holders—Bit—

Angular, P. doz. \$24.00..... 45@10%

Door—

Empire..... 50%

Bardsley's..... 45@%

File and Tool—

Nicholson File Holders and File Handles..... 33@40@%

Hooks—Cast Iron—

Bird Cage, Reading..... 60@%

Bird Cage, Sargent's List..... 60@10

Ceiling, Sargent's List..... 50@10

Clothes Line, Reading List..... 60@10

Clothes Line, Sargent's List..... 50@10

Coat and Hat, Sargent's List..... 50@10

Iwan's Coat and Hat..... 50@10

Coat and Hat, Reading..... 45@20

Coat and Hat, Stowell's..... 70@

Coat and Hat, Wrights..... 65@

Harness, Reading List..... 65@

Harness, Stowell's..... 60@

School House, Stowell's..... 70@

Wire—

Belt..... 80@10@% x

Wire C. & H. Hooks..... 75@10@75@10@5%

Atlas, Coat and Hat:

Single Cases..... 75@10

10 Case Lots..... 75@10

Columbian Hdw. Co. Gem..... 60@10

Parker Wire Goods Co. King..... 75@10

Van Wagoner, Coat and Hat..... 70@

Western W. G. Co. Molding..... 75@

Wire Goods Co.:

Acme..... 60@10@

Chief..... 70@

Crown..... 70@10@

Czar..... 65@

V. Brace..... 70@10@

Car Harness..... 50@10@

Wrought Iron—

Bor. 6 in., per doz., \$1.00; 8 in.,

\$1.25; 10 in., \$2.50.

cotton..... doz. \$1.05@1.25

Wright Staples, Hooks, &c.—

See Wrought Goods.

Miscellaneous—

Bench, see Stops, Bench.

Bush, Light, doz. \$4.75; Medium,

\$5.35; Heavy, 36.25

Grass.... Nos. 1 2 3 4

Best..... \$1.50 1.75 2.00

Common..... \$1.30 1.30 1.40 1.60

Potato and Manure..... 60@15@

Whiffetree..... lb. 5@6@

Holes and Eyes:

Bronze..... 60@10@10@70@

Malleable Iron..... 70@10@75@

Covert Mfg. Co., Gate and Scuttle

Hooks..... 35@

Covert Saddlery Works' Self Locking

Gate and Door Hook..... 60@

Ft. Madison Cut-Easy Corn Hooks, 1 doz. \$3.25 net

Bench Hooks—See Bench Stops.

Corn Hooks—See Knives, Corn.

Horse Nails—

See Nails, Horse.

Horseshoes—

See Shoes, Horse.

Hose, Rubber—

Garden Hose, 3/4-inch:

Competition..... ft. 5 @ 6@

3-ply Standard..... ft. 8 @ 9@

4-ply Standard..... ft. 10 @ 11@

3-ply extra..... ft. 11 @ 13@

4-ply extra..... ft. 14 @ 16@

Cotton Garden, 3/4-in., coupled:

Low Grade..... ft. 8 @ 9@

Fair Quality..... ft. 10 @ 11@

Irons—Sad—

From 4 to 10..... lb. 2@3@

B. B. Sad Irons..... lb. 3@4@3@4@

Chinese Laundry..... lb. 4@5@

Chinese Sad..... lb. 4@4@4@

Mrs. Potts' cents per set:

Nos. 50 55 60 65

Jap'd Tops..... 65 59 70 70

Tin'd Tops..... 65 62 70 72

New England Pressing, lb. 3@4@4@

Pinking—

Pinking Irons..... doz. 50@60@

Soldering—

Soldering Coppers, 2@ & 3@ 2@ & 2@

1/2 & 2..... 2@ & 2@

Jacks, Wagon—

Covert Mfg. Co.:

Auto Screw..... 30@5%

Steel..... 45@2%

Covert's Saddlery Works:

Daisy..... 60@10%

Victor..... 60@

Lockport..... 50@

Lane's Steel..... 30@10@5%

Richards' Tiger Steel, No. 130..... 40@

Kettles—

Brass, Spun, Plain..... 20@25%

Enamelled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c..... 30@

Smith & Hemenway Co. 40@10%

Wilkinson Shear & Cutlery Co. 50@

Corn—

Withington Acme, P. doz. \$2.65@

Dent, \$2.75@; Adj. Serrated, \$2.20@

Serrated, \$2.10@; Yankee No. 1, \$1.50@

Yankee No. 2, \$1.15@

Drawing—

Standard List..... 70@10@75@10@5%

C. E. Jennings & Co., Nos. 45, 46, 47

Jennings & Griffin, Nos. 11, 42, 43

Ohio Tool Co. 70@

Swan's..... 16@2@

Watrous..... 16@2@

L. & I. J. White..... 20@5@2@

Hay and Straw—

Serrated Edge, per doz. \$5.25@5.50@

Iwan's Sickle Edge..... P. doz. \$5.50@

Iwan's Serrated..... P. doz. \$10.00@

Drawing—

Buffalo..... P. gro. \$13.00

Mincing—

Buffalo..... P. gro. \$13.00

Miscellaneous—

Farrier's..... doz. \$3.00@3.25@

Wostenholm's..... P. doz. \$3.00@3.25@

Knobs—

Base, 2 1/2-inch, Birch, or Maple, Rubber tip..... gro. \$1.15@1.20@

Carriage, Jap., all sizes..... gro. \$0.60@1.50@

Door, Mineral..... doz. 65@70@70@

Door, Por. Jap'd..... doz. 70@75@75@

Door, Por. Nickel..... doz. \$2.05@2.15@

Bardale's Wood Door, Shutters, &c., 15@

Picture, Sargent's..... 60@10@10@

Lacing, Leather—

See Belting, Leather.

Ladders, Store, &c.—

Lane's Store..... 25%

Myers' Noiseless Store Ladders..... 50%

Richards Mfg. Co.:

Improved Noiseless, No. 112..... 40@

Climax Shelf, No. 113..... 40@

Trolley, No. 109..... 40@

Leather, Tubular—

Regular Tubular, No. 0..... doz. \$1.35@1.75@

Lift Tubular, No. 0, doz. \$4.75@5.25@

Hinge Tubular, No. 0..... doz. \$3.75@5.25@

Other Styles..... doz. \$1.00@1.00@1.00@

Bull's Eye Police—

No. 1, 2 1/2-inch..... \$2.50@2.75@

No. 2, 3-inch..... \$2.75@3.00@

Lasts and Stands, Shoe—

Stowell's Asian Malleable Iron..... 50%

Stowell's Badger, Cast Iron..... 50%

Quaker's Cattle—

Roggins' Latches, with screw..... doz. \$1.35@1.40@1.40@

Door—

Richards' Bull Dog, Heavy, No. 125..... 50%

Richards' Trump, No. 127..... 50%

Leaders, Cattle—

Small..... doz. 50@; large, 50@

Covert Mfg. Co. 55@</p

Tarred Paper—

1 <i>ply</i> (roll 300 sq. ft.), ton . . .	\$32.50@35%
2 <i>ply</i> , roll 108 sq. ft.	55@60%
3 <i>ply</i> , roll 108 sq. ft.	78@85%
Stater's Felt (roll 500 sq. ft.). . . .	75%
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.)	\$2.75

Sand and Emery—

Flint Paper and Cloth	60@60&10%
Garnet Paper and Cloth	25%
Emery Paper and Cl'h. 50@10@60%	

Parers—Apple—

Advance	10 doz. \$4.00
Baldwin	10 doz. \$4.00
Bonanza Improved	each \$6.50
Daisy	10 doz. \$4.00
Dandy	each \$7.50
Eureka Improved	each \$2.00
Family Bay State	10 doz. \$15.00
Improved Bay State	10 doz. \$3.00
Little Star	10 doz. \$5.00
New Lightning	10 doz. \$7.00
Reading 72	10 doz. \$3.25
Reading 78	10 doz. \$6.25
Rocking Table	10 doz. \$6.25
Turn Table '98	10 doz. \$6.00
White Mountain	10 doz. \$5.00

Potato—

Saratoga	10 doz. \$7.00
White Mountain	10 doz. \$6.00

Picks and Mattocks—

List Feb. 23, 1899 70@5@75%

Pinking Irons—

See Irons, Pinking.

Pins, Escutcheon—

Brass	60@60&10%
Iron, list Nov. 11, '85	60@60&10%

Pipe, Cast Iron Soil—

Standard, 2-6 in.	50@10%
Estra Heavy, 2-6 in.	65@10%
Fittings	70@10%

Pipe, Merchant—**Carload Lots.**

Steel.	Iron.
Bik. Galv. Blk. Galv.	
½ & ¼ in.	68½% 52½% 66½% 56½%
¾ & ½ in.	60½% 70½% 58½%
6 & 6 in.	76½% 66½% 75% 65%
7 to 12 in.	71½% 59½% 70% 54½%

Pipe, Sewer—

Jobbers' Prices—	
Standard Pipe and Fittings, 2 to 24 in.:	
New England	67%
New York and New Jersey	70%
Maryland, Delaware, E. Pa.	72%
West. Pa. and West Va.	73%
Virginia	75%
Ohio, Michigan and Ky.	75%
Indiana	77%
NOTE.—Carload lots are generally delivered.	
Pipe, Stove—	
Edwards' Nested Stove Pipe:	
C. L. L. C. L. 5 in., per 100 joints	\$7.00 \$8.00
6 in., per 100 joints	7.50 8.50
7 in., per 100 joints	8.50 9.50
Planes and Plane Irons—	
Wood Planes—	
Bench, first qual.	40@10%
Bench, Second qual.	50@10%
Molding	55@10@10%
Bailey's (Stanley R. & L. Co.)	50@10@25@10@10%
Chapin-Stephens Co.:	
Bench, First Quality	40@10@10%
Bench, Second Quality	50@10@10%
Molding	33½@33½@10%
Toy and German	30@10@10@10%
Chaplin's	60%
Ohio Tool Co.:	
Bench, First Quality	40@10@10%
Bench, Second Quality	50@10@10%
Molding	33½@33½@10%
Adjustable Wood Bottom	60%
Union	60%
Iron Planes—	
Bailey's (Stanley R. & L. Co.)	25@10@25@10@10%
Chaplin's Iron Planes	50@10%
Miscellaneous Planes (Stanley R. & L. Co.)	20@10@20@10@10%
Ohio Tool Co.'s Iron Planes	60%
Sargent's	50@10@10%
Union	60%
Plane Irons—	
Wood Bench Plane Irons	25@10@30%
Buck Bros.	30%
Chaplin-Stephens Co.	30@30@10%
Ohio Tool Co.	30%
Stanley R. & L. Co.	20@10@20@10@10%
Union	50%
L. & I. J. White	20@5@25%
Planters, Corn, Hand—	
Kohler's Eclipse	10 doz. \$8.50
Plates—	
Fellow	lb. 3½@4½¢
Self-Sealing Pie Plates (S. S. & Co.), 10 doz. \$2.00	50%
Pliers and Nippers—	
Button Pliers	75@10@80%
Gas Burner, per doz., 5 in., \$1.25 @ \$1.30; 6 in., \$1.45 @ \$1.50.	
Gas Pipe	7 8 10 12-in. \$2.00 \$2.25 \$3.00 \$3.75
Acme Nippers	50@50@5%
Cronk & Carrier Mfg. Co.:	
American Button	75@10%
Cronk's	60%
Improved Button	60@10%
Stub's Pattern	50@10%
Combination and others	33½%
Heller's Farriers' Nippers, Pincers and Tools	40@10@40@10@10%

Presses—**Fruit and Jelly—**

Enterprise Mfg. Co. 20@25%

Seal Presses—

Morrill's No. 1, 10 doz. \$20.00 50%

Pruning Hooks and Shears

See Shears.

Pullers, Cork—

Invincible Cork Puller \$21.00

Pullers, Nail—

Cyclopa 50%

Miller's Falls, No. 3, 10 doz. \$12.00 33½@10%

Morrill's No. 1, Nail Puller, 10 doz. \$20.00 50%

Pearson No. 1, Cyclone Spike Puller, each \$30.00 50%

Pelican, 10 doz. \$9.00 10@10%

Scranton, Case Lots: No. 2B (large) \$5.00

No. 3B (small) \$5.00

Smith & Hemenway Co.: Diamond B. No. 2, case lots \$10.00

Diamond B. No. 3, case lots \$15.00

Giant, No. 1, 10 doz. \$18; No. 2, 16.50; No. 3, \$15 10@10@5@5%

Stowell's: Cast Rail \$10.00

Steel Rail, Plain \$12.00

Wrought Bracket, 1½-in. \$12.00

Wrought Bracket, 1½-in. x 5-in. \$12.00

Swett's Hylo, 10 ft. 11¢ 50%

P. L. B. Steel Rail \$100 ft. \$3.00

No. 0, 1 x 3-in. \$100 ft. \$2.75

Stowell's: Cast Rail \$10.00

Steel Rail, Plain \$12.00

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Sisal, Tarred, Medium Lath Yarn:
Mixed.....lb. 75¢
Pure.....lb. 90¢
Cotton Rope:
Lb. Best, 1/4-in. and larger.....16¢
Medium, 1/4-in. and larger.....14¢
Common, 1/4-in. and larger.....10¢
Jute Rope:
Thread No. 1, 1/4-in. & up, lb. 6¢
Thread No. 2, 1/4-in. & up, lb. 5¢
Old Colony Manila Transmission Rope.....lb. 17½¢

Wire Rope—

Galvanized.....42¢
Plain.....50¢

Ropes, Hammocks—

Covert Mfg. Co.:
Jute.....50¢
Sisal.....55¢

Covert Saddlery Works.....50¢

Rules—

Boxwood.....\$0.00
Ivory.....35¢
Chapin-Stephens Co.:
Boxwood.....60¢
Ivory.....50¢
Miscellaneous.....50¢
Combination.....50¢
Stationers'.....10¢

Kaufel & Easer Co.:
Folding, Wood.....35¢
Folding, Steel.....33¢
Lufkin's Steel.....50¢
Lufkin's Lumber.....60¢
Stanley R. & L. Co.:
Boxwood.....60¢
Ivory.....35¢
Upson Nut Co.:
Boxwood.....60¢
Ivory.....35¢

Sash Balances— See Balance, Sash.
Sash Locks—
See Locks, Sash.
Sash Weights—
See Weights, Sash.
Sausage Stuffers or Fillers—
See Stuffers or Fillers, Sausage.
Saw Frames—
See Frames, Saw.
Saw Sets— See Sets, Saw.
Saw Tools— See Tools, Saw.
Saws—

Atkins':
Circular.....50¢
Band.....50¢
Cross Cut.....55¢
Mulay, Mill and Drag.....50¢
One-Man Saw.....40¢
Wood Saws.....40¢
Hand, Compass, &c.....40¢
Chapin-Stephens Co.:
Turning Saws and Frames.....30¢
Diamond Saw & Stamping Works:
Sterling Kitchen Saws.....30¢
10¢
Dissont's:
Circular, Solid and Ins'ted Tooth.....50¢
Band, 2 to 14 in. wide.....60¢
Band, 1/4 to 1%.....60¢
Crosscuts.....50¢
Narrow Crosscuts.....50¢
Mulay, Mill and Drag.....50¢
Framed Woodsaws.....50¢
Woodsons Blades.....50¢
Woodson Rods.....50¢
Hand Saws, Nos. 12, 99, 9, 16, d100.....50¢
Diamond 12, 76, 71, 8.....50¢
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination.....50¢
Compass, Key Hole, &c.....25¢
Butcher Saws and Blades.....35¢
C. E. Jennings & Co.'s:
Back Saws.....25¢
Butcher Saws.....30¢
Compass and Key Hole Saws.....35¢
Framed Wood Saws.....30¢
Hand Saws.....20¢
Wood Saw Blades.....35¢
Millers Falls:
Butcher Saws.....15¢
Star Saw Blades.....15¢
Peace & Richardson's Hand Saws.....30¢
Simonds':
Circular Saws.....50¢
Crescent Ground Cross Cut Saws.....35¢
One-Man Cross Cuts.....40¢
Gang Mill, Mulay and Drag Saws.....50¢
Band Saws.....50¢
Rock Saws.....25¢
Butcher Saws.....35¢
Hand Saws.....25¢
Hand Saws, Bay State Brand.....45¢
Compass, Key Hole, &c. 25¢
Wood Saws.....35¢
Springfield Mach. Screw Co.:
Diamond Kitchen Saws.....40¢
Butcher Saws Blades.....35¢
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws.....50¢

Hack Saws—

Atkins' Hack Saw Blades A A.....25%
Dissont's:
Concave Blades.....25%
Keystone.....40%
Hack Saw Frames.....30%
Pittsburgh File Works, The Best.....25%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180.....10¢
Hack Saws, Nos. 175, 180, complete.....10¢
Hack Saws, Nos. 175, 180, complete.....10¢
Goodell's Hack Saw Blades.....45¢
Griffin's Hack Saw Frames.....35¢
Griffin's Hack Saw Blades.....35¢
Springfield Mach. Screw Co.:
Diamond Hack Saw Blades.....35¢
Diamond Hack Saw Blades.....50¢
Star Hack Saws and Blades.....15¢
Sterling Hack Saw Blades.....35¢
Sterling Hack Saw Frames.....30¢

Scroll—

Barnes' No. 1, \$15.....25%
Barnes' Scroll Saw Blades.....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, \$18.....20%
Lester, complete, \$10.00.....15¢
Rogers, complete, \$4.00.....15¢

Scalers, Fish—

Covert's Saddlery Works.....60¢

Scales—

Family, Turnbull's.....50¢

Counter:

Hatch, Platform, 1/2 oz. to 4 lbs.....

Tops, Platforms, 1/2 oz. to 8 lbs.....

Union Platform, Plain.....\$1.85

Union Platform, Stpd.....\$1.85

Chatillon's:

Eureka.....25¢

Favorite.....40¢

Crocker's Trip Scales.....50¢

Chicago Scale Co.:

The "Little Detective".....25 lbs

Union or Family No. 2.....60¢

Portable Platform (reduced list).....50¢

Wagon or Stock (reduced list).....25¢

The Standard Portables.....50¢

R. R. and Wagon.....50¢

Scrapers—

Box, 1 Handle.....doz. \$2.00

Box, 2 Handle.....doz. \$2.60

Box, 3 Handle.....\$2.00

Box, 4 Handle.....\$2.50

Box, 5 Handle.....\$2.00

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Box, 125 Handle.....\$2.00

Box, 12

Pike Mfg. Co., 1901 list:
Black Diamond S. S. 3¢ gro. \$12.00
Lamoille S. S. 3¢ gro. \$11.00
White Mountain S. S. 3¢ gro. \$6.00
Green Mountain S. S. 3¢ gro. \$7.50
Extra Indian Pond S. S. 3¢ gro. \$7.00
No. 1 Indian Pond S. S. 3¢ gro. \$4.50
No. 2 Indian Pond S. S. 3¢ gro. \$4.50
Leader Red End S. S. 3¢ gro. \$4.50
Emery and Corundum, 10 in.
3¢ gro. \$9.00
Pure Corundum, 10 in. 3¢ gro. \$12
Crescent S. S. 3¢ gro. \$7.00
Emery Scythe Rifes, 2 Coat. \$8
Emery Scythe Rifes, 3 Coat. \$10
Emery Scythe Rifes, 4 Coat. \$12
Balance of 1904 list 33½%
Oil Stones, &c.—
Chicago Wheel & Mfr. Co., 1901 list:
Gem Corundum Oil, Double Grit, 50%
Gem Corundum Axe, Single or Double Grit, 55%
Gem Corundum Slips, 55%
Gem Corundum Razor Hones, 50%
Pike Mfg. Co., 1901 list:
3¢ gro.
Arkansas St. No. 1, 3 to 5½ in. \$2.80
Arkansas St. No. 1, 5½ to 8 in. \$3.50
Arkansas Slips No. 1, \$4.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in. 60¢
Washita St. Extra, 4 to 8 in. 50¢
Washita St. No. 1, 4 to 8 in. 40¢
Washita St. No. 2, 4 to 8 in. 30¢
Lily White Slips, 50¢
Rosy Red Slips, 50¢
Washita Slips, Extra, 50¢
Washita Slips, No. 1, 50¢
Washita Slips, No. 2, 50¢
India Oil Stones (entire list), 33½%
Quickcut Emery and Corundum Oil, Stone, Double Grit, 33½%
Quickcut Emery and Corundum Axe, Stone, Double Grit, 33½%
Quickcut Emery Rubbing Bricks, 33½%
Hindostan No. 1, R'g'lar. 30 lb. 10¢
Hindostan No. 1, Small. 30 lb. 10¢
Axe Stones (all kinds), Turkey Oil Stones, Extra, 5 to 8 in.
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips, 50¢
Sand Stone, Belgian, German and Swat Razors, Hones, Natural Grit Carving Knife, Hones, Quick Edge Pocket Knife, Hones, Mounted Kitchen Sand Stone, 50¢
30¢
Stoners, Cherry—
Enterprise, 35¢@30%
Stoppers, Bottle—
Victor Bottle Stoppers, 3¢ gro. \$9.00
Stops—Bench—
Millers Falls, 15&10%
Morrill's, No. 1, \$10.00.....50¢
Morrill's, No. 2, \$12.50.....50¢
Door—
Chapin-Stephens Co., 60@60&10%
Plane—
Chapin-Stephens Co., 20%
Straps—Box—
Cary's Universal, case lots, 20&10&10%
Hame—
Covet's Saddlery Works, 60@10%
Stretchers, Carpet—
Cast Iron, St'l Points, doz. 55@60%
Socket, 1.75
Excelsior Stretcher and Tack Hammer Combined, 3¢ doz. \$6.00.....20%
Stuffers, Sausage—
National Mfg. Co., 25@25&7½%
National Specialty Co., list Jan. 1, 1902, 30&5%
Sweepers, Carpet—
National Sweeper Co.: 50¢
Auditorium, Roller Bearing (26 in. case), Nickel, \$45.00
Mammoth, Roller Bearing (30 in. case), Nickel, \$60.00
Marion, Roller Bearing, regular finishes, full Nickel, \$24.00
Marion Queen, Roller Bearing, full Nickel, \$24.00
Monarch, Roller Bearing, N'kel, \$26.00
Monarch, Roller B'r'g, Jap'ned, \$20.00
Transparent, Roller Bearing, Plate Glass Top, Nickel, \$36.00
Monarch Extra, Roller Bearing, (17-in. case), Nickel, \$36.00
Monarch Extra, Roller Bearing, (17-in. case), Jap'ned, \$38.00
National Queen, Fancy Veneers, \$27.00
Perpetual, Regular B'r'gs, Nkl., \$20.00
Perpetual, Regular B'r'gs, Jap., \$18.00
NOTE.—Rebates: 50¢ per dozen on three-dozen lots; \$1 per dozen on five-dozen lots; \$2 per dozen on ten-dozen lots; \$2.50 per dozen on twenty-five-dozen lots.
Tacks, Brads, &c.—
List Jan. 15, '99.
Carpet Tacks, 90¢@10@. 3¢
American Cut Tacks, 90¢@25@. 3¢
Sweden Cut Tacks, 90¢@30@10@. 3¢
Sweden Upholsterers' Tacks, 90¢@5¢@10@. 3¢
Gimp Tacks, 90¢@5¢@10@. 3¢
Lace Tacks, 90¢@5¢@10@. 3¢
Trimmers' Tacks, 90¢@30@10@. 3¢
Looking Glass Tacks, 70¢@10@5@. 3¢
Bill Posters' and Railroad Tacks, 90¢@5¢@10@. 3¢
Hungarian Nails, 80¢@30@5@. 3¢
Common and Patent Brads, 90¢@10@5@. 3¢
Trunk and Clout Nails, 80¢@10@. 3¢
NOTE.—The above prices are for Straight Weights. An extra 5% is given on Star Weights** and an extra 10@% on Standard Weights.***
Miscellaneous—
Double Pointed Tacks, 90¢@6 or 7 tons
Steel Wire Brads, R. & E. Mfg. Co.'s list, 50@10@60%
See also Nails, Wire.

Tanks, Oil—

Emerald, S. S. & Co., 30-gal. \$3.40
Red Star, family size, bent frame, \$3.25
Red Star, family size, stationary protector, \$3.25
Double Zinc Surface: Saginaw Globe, family size, stationary protector, \$2.90
Cable Cross, family size, stationary protector, \$3.15
Single Zinc Surface: Naiad, family size, open back, perforated, \$2.65
Saginaw Globe, protector, family size, ventilated back, \$2.50
Brass Surface: Brass King, Single Surface, open back, \$3.25

Flax Twine: B.C. B.

No. 9, 1/4 and 1/2-lb. Balls, 22@2¢

No. 12, 1/4 and 1/2-lb. Balls, 18@20¢

No. 18, 1/4 and 1/2-lb. Balls, 16@18¢

No. 24, 1/4 and 1/2-lb. Balls, 16@18¢

No. 36, 1/4 and 1/2-lb. Balls, 15@17¢

Chalk Line, Cotton 1/2-lb. Balls, 30¢

Cotton Mops, 6, 9, 12 and 15 lb. to doz., 9½@11¢

Cotton Wrapping, 5 Balls to lb., according to quality, 13½@20¢

American 2-Ply Hemp, 1/4 and 1/2-lb. Balls, 13@14¢

American 3-Ply Hemp, 1-lb. Balls, 13@14¢

India 2-Ply Hemp, 1/4 and 1/2-lb. Balls (Spring Time), 8¢

India 3-Ply Hemp, 1-lb. Balls, 7@8¢

India 3-Ply Hemp, 1½-lb. Balls, 13@14¢

Patent Leather, 25@30@5%

Steel, 10@12@10@

Chesterman's, 25@25@5%

Eddy Asses' Skin, 40@10@50%

Eddy Patent Leather, 25@30@5%

Eddy Steel, 40@40@10@

Keuffel & Esser Co.: Favorite, Ass Skin, 40@10@50%

Favorite, Duck and Leather, 25@5@25@10%

Metallic and Steel, lower list, 35@35@5%

Pocket, 35@35@5%

Lufkin's: Asses' Skin, 40@10@50%

Metallic, 30@30@5%

Patent Bend, Leather, 25@25@10@

Pocket, 40@40@5%

Steel, 33@35@

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 5¢/inch and larger, per 100 lbs. \$3.00

Thermometers—

Tin Case, 80¢@10@80¢@10@5%

Ties, Bale—Steel Wire—

Single Loop, 80¢@2½%

Monitor, Cross Head, do. 70¢

Brick Ties—

Niagara Brick Ties, 25@10%

Tinners' Shears, &c.—

See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works, 60@10@10%

Tire Benders, Upsetters, &c. See Benders and Upsetters, Tire.**Tools—Coopers—**

L. & I. J. White, 20@20@5%

Hay—

Myers' Hay Tools, 40¢

Stowell's Hay Carriers, 50¢

Stowell's Hay Forks, 50¢

Stowell's Fork Pulleys, 50¢

Saw—

Atkins' Cross Cut Saw Tools, 40¢

Simonds' Improved, 35½¢

Simonds' Crescent, 25¢

Ship—

L. & I. J. White, 25%

Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme, doz. \$1.15@\$1.25; gro. \$11.50@12.00

Harper, Champion or Paragon, doz. \$1.25@1.40; gro. \$13.00@13.50

Game—

Oneida Pattern, 75@10@75@10@5%

Newhouse, 45@45@5%

Hawley & Norton, 65¢

Victor and Oneida, 70@10@70@10@5%

O. C. Jump (Blake Pat.), 60@60@60@10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes, 8½@9¢

Mouse, Round or Square Wire, doz. 85@90¢

Marty French Rat and Mouse Traps (Genuine):

No. 1, Rat, each \$1.21; gro. \$13.25

No. 3, Rat, gro. \$6.50; case of 50, \$35.75 doz.

No. 3½, Rat, gro. \$5.25; case of 72, gro. \$4.70 doz.

No. 4, Mouse, gro. \$3.85; case of 150, \$3.00 doz.

No. 5, Mouse, gro. \$3.00; case of 150, \$2.25 doz.

Trimmers, Spoke—

Wood's E. I., 50¢

Trowels—

Dixon Brick and Pointing, 30¢

Dixon Plastering, 25¢

Dixon "Standard Brand" and Garden Trowels, 35¢

Kohler's Steel Garden Trowels, 5 in., gro. \$1.80

Kohler's Steel Garden Trowels, 6 in., gro. \$2.00

Never-Break Steel Garden Trowels, gro. \$2.00

Rose Brick and Plastering, 25¢

Woodrough & McParlin, Plastering, 25¢

Trucks, Warehouse, &c.—

B. & L. Block Co.: New York Pattern, 50@10% Western Pattern, 60@10%

Handy Trucks, 60@12@10@

Grocery, 60@12@10@

Daisy Stove Trucks, Improved Pattern, 60@12@10@

McKinney Trucks, 60@12@10@

Model Stove Trucks, 60@12@10@

Inch, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633